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FM 1-112

**TACTICS, TECHNIQUES,
AND PROCEDURES
FOR THE**

ATTACK HELICOPTER BATTALION

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HEADQUARTERS, DEPARTMENT OF THE ARMY



Field Manual 1-112

HEADQUARTERS
 DEPARTMENT OF THE ARMY
 Washington, DC, 21 February 1991

TACTICS, TECHNIQUES, AND PROCEDURES
 FOR THE
 ATTACK HELICOPTER BATTALION

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PREFACE

This publication describes the organizational structure of the attack helicopter battalion and discusses its doctrinal and tactical employment on the modern battlefield. Techniques are briefly described to further illustrate employment of the battalion. Appendixes A through G provide supplemental information on attack planning and terrain analysis, air combat operations, deep operations, NBC operations, suppression of enemy air defense, unit movement, and risk management. Appendix H is an example of a command post annex to a tactical SOP. Appendix I contains information on target coordination and laser designation, and Appendix J provides information on Kiowa Warrior employment. The L-series TOE serves as the basis for the units discussed. This publication is based on the doctrinal and tactical employment principles outlined in FMs 1-100, 1-111, 71-100, 100-5, and 100-15. This publication addresses the Army Aviation Mission Area Concept application to antiarmor operations according to the Concept-Based Requirements System.

Assigned to division, corps, and some EAC aviation brigades, attack helicopter battalions are organized and equipped to attack enemy forces anywhere on the battlefield. Their speed, flexibility, and ability to mass combat power rapidly allow the force commander to weigh the battle at the critical moment. Successful employment of this organization on the modern battlefield depends heavily on the synergistic efforts of combined arms forces.

This publication applies to commanders and staffs who will lead, employ, or fight with attack helicopter battalions. It also serves as a reference document for flight crews learning to understand and conduct attack helicopter operations.

The proponent of this publication is HQ TRADOC. Send comments and recommendations on DA Form 2028 directly to the Commander, United States Army Aviation Center and Fort Rucker, ATTN: ATZQ-DOT-DD, Fort Rucker, AL 36362-5263.

This publication implements the following international agreements:

STANAG 2019 (Edition Three) and QSTAG 509	Military Symbols for Land Based Systems--APP-6
STANAG 2041 (Edition Four) and QSTAG 520	Operation Orders, Tables and Graphics for Road Movement
STANAG 2404	Joint Anti-Armour Operations (Draft)
STANAG 2868 (Edition Four)	Land Force Tactical Doctrine--ATP-35(A)
STANAG 2889 (Edition Three) and QSTAG 742	Marking of Hazardous Areas and Routes Through Them
STANAG 2999 (Edition One)	Use of Helicopters in Land Operations-- ATP-49

STANAG 3497 (Edition One)

Aeromedical Training of Aircrew in
Aircrew NBC Equipment and Procedures

QSTAG 277 (Edition Three)

Procedures for the Employment of
Helicopters in the Antiarmor Role

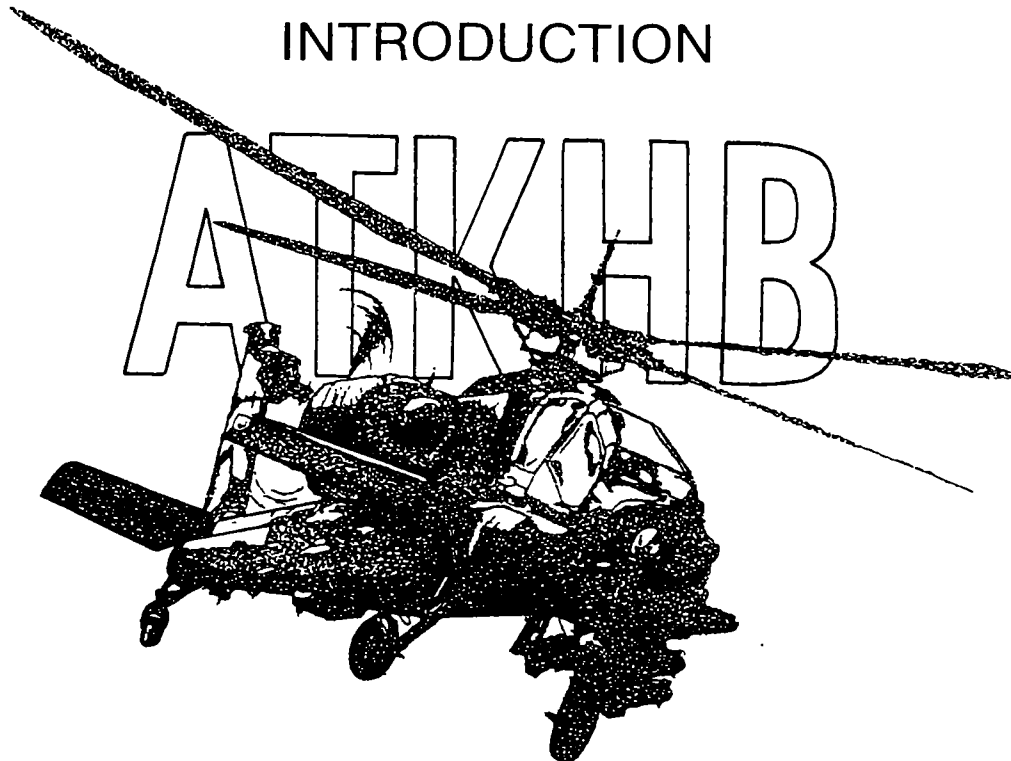
Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

This publication has been reviewed for OPSEC considerations.



Chapter 1

INTRODUCTION



Attack helicopter battalions are assigned to divisional aviation brigades, corps attack helicopter regiments (in corps aviation brigades), and some EAC aviation brigades. They provide the force commander a highly mobile and lethal antiarmor, antipersonnel, antimateriel, air-to-air destruction capability both during the day and at night. This chapter tells what an ATKHB is, its mission, how it is organized, and how it integrates with AirLand Battle doctrine as described in FMs 1-100 and 100-5.

1-1. ROLE OF THE ATKHB

a. The ATKHB is a combat maneuver unit. It is employed as a battalion and conducts supporting attacks which aid, protect, and complement other maneuver forces. By using aerial maneuver, the ATKHB enables the force commander to mass combat power rapidly at the decisive time and place, changing a battle's outcome. Therefore, it must be integrated into the commander's tactical maneuver plan along with other maneuver units. When employed with other combat assets, the ATKHB can strike the enemy where and when it is most vulnerable.

b. An ATKHB never fights alone. It coordinates its attacks with other maneuver, combat support, combat service support, joint, and combined forces to form a combined arms team that overwhelms and surprises the enemy at the point of attack. Attacks may be conducted out of physical contact with other friendly forces but synchronized with their scheme of maneuver, or they may be in direct contact with friendly forces.

1-2. AIRLAND BATTLE DOCTRINE

Success on future battlefields depends on how well the tenets of AirLand Battle doctrine are applied. These tenets are initiative, depth, agility, and synchronization.

a. Initiative. Attack helicopters are offensive weapon systems. They provide commanders the means to deliver massed firepower rapidly and accurately, thus disorganizing enemy forces and allowing the friendly force to gain or maintain the initiative. To be successful, the ATKHB must be integrated into the force commander's scheme of maneuver. This requires that commanders see the battlefield and decide early where the ATKHB will be deployed.

b. Depth. The ATKHB can attack enemy forces anywhere on the battlefield. Commanders must see and use the entire battlefield to strike the enemy and prevent it from concentrating forces at a point of its choice. The speed with which attack helicopters can mass combat power at chosen points in the battle area allows the force commander to influence the battle to a degree that would otherwise be beyond his reach.

c. Agility. The mobility and flexibility of attack helicopters expand the reach of commanders to all areas of the battlefield. Terrain provides cover and concealment for attack helicopters just as it does for armor and infantry; however, it does not limit the mobility of the helicopter. The ATKHB can attack the enemy's flanks and rear and provide ground forces the time to maneuver and engage enemy forces from directions where they are most vulnerable.

d. Synchronization. To survive and succeed on the battlefield, the ATKHB must fight as an integrated member of the combined arms team. In combat, the fires of other attacking weapons enhance the firepower of the attack helicopter. This combined attack strengthens the total force by overcoming weaknesses found in each weapon system. As a result, total combat power is increased and survivability is improved. When the enemy is faced with an array of armor, infantry, field artillery, TACAIR, and attack helicopter units, it can no longer concentrate on countering a single set of weapons from one direction. Rather, it is attacked throughout its depth as each unit engages within the limits of its capabilities.

1-3. SPECTRUM OF CONFLICT

ATKHBs will be used throughout the spectrum of conflict from low- to high-intensity. They will be expected to fight at different levels in the spectrum according to their mission-essential task lists and the mission of the larger unit to which they are assigned. The fundamentals of ATKHB operations do not change with intensity of the conflict. ATKHBs are combat units that use rapid maneuver and firepower to destroy the enemy and increase the tempo of operations. Methods of employment and the mass that is necessary to accomplish the mission of an ATKHB will change with the intensity of the conflict.

a. In mid- to high-intensity conflicts, the ATKHB will tend to be used more in mass against armor and mechanized forces. It will normally be task-organized pure or reinforced to take advantage of its speed and firepower. The ATKHB's basic load and the combat loads of its aircraft will be oriented toward the primary mission--antiarmor.

b. In low-intensity conflicts, the ATKHB will be task-organized more with other aviation assets and be used less in mass. However, it remains a maneuver unit and operates as a battalion. When the ATKHB (or elements of the ATKHB) are part of an AATF or the battalion is placed under OPCON of a ground brigade, it must be integrated in the ground maneuver plan from the start and not used as an element that answers calls for fire. During LICs, an ATKHB may operate using a variation of the continuous attack technique. When applying this technique, the battalion attacks the enemy using the appropriate combat power for each attack. In this manner, the ATKHB may maneuver with several ground units simultaneously. The basic load and the combat loads of battalion aircraft will be oriented toward antipersonnel and antimateriel. However, the ATKHB remains the light division's best antiarmor force and must be prepared to shift rapidly to antiarmor operations.

1-4. MISSION

a. The mission of an ATKHB is to destroy massed enemy mechanized forces and other forces with aerial firepower, mobility, and shock effect. The ATKHB conducts deep, close, and rear operations, allowing the force commander to gain and maintain the initiative. As part of its mission, the ATKHB will also--

- Conduct SEAD operations.
- Coordinate and adjust indirect fires.
- Conduct reconnaissance and security operations.
- Conduct both offensive and defensive air combat.
- Destroy enemy communication and logistical assets.
- Conduct joint air attacks with TACAIR and field artillery.

b. The ATKHB is most effective against massed, moving targets and least effective against enemy forces that are in prepared, well-camouflaged positions. Without the support of ground maneuver forces, the ATKHB cannot conduct missions that require the occupation of terrain. However, they can deny the enemy terrain for a limited time by dominating it with direct and indirect fires. Fire support provided by artillery and CAS is important to the ATKHB. Fire support suppresses enemy air defenses, causes armored vehicles to "button-up," and multiplies the combat power of the ATKHB.

1-5. ORGANIZATION

a. The organization of ATKHBs assigned to heavy divisions, air assault divisions, airborne divisions, and ATKHRs consists of a headquarters and headquarters company, an AVUM company, and three ATKHCs. Figure 1-1 shows a basic ATKHB organization.

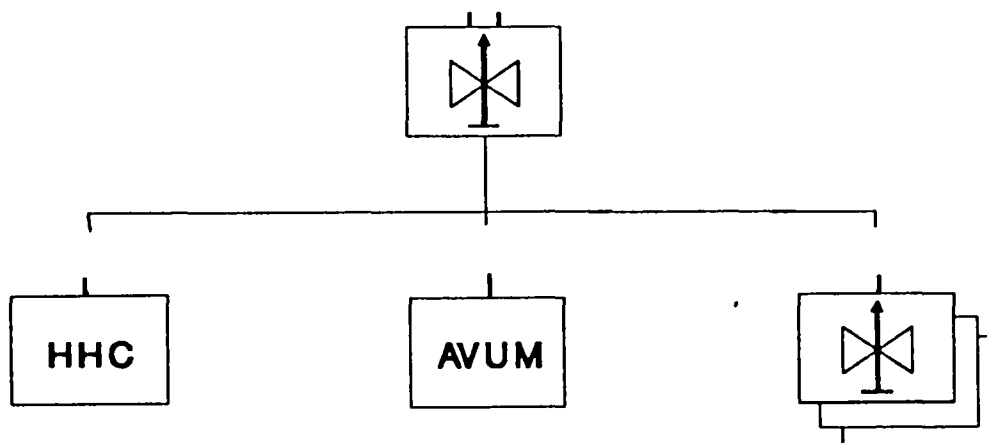


Figure 1-1. Basic organizational structure of an ATKHB

(1) The HHC provides command and control, logistics support, and ground maintenance support for the battalion. The headquarters section consists of the battalion commander, his staff, and the staff sections. The headquarters and headquarters company consists of a company headquarters, a supply section, an automotive maintenance section, a mess section, a battalion communications section, a medical treatment section, a battalion aviation section, and a Class III/V platoon.

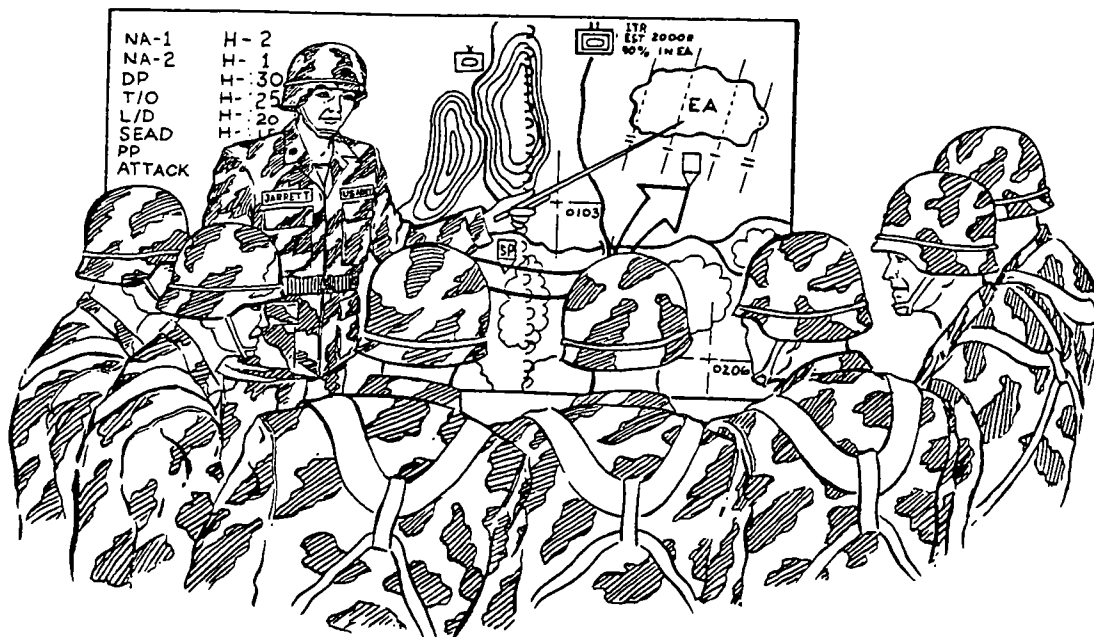
(2) The AVUM company provides unit-level maintenance for battalion aircraft. This company consists of a company headquarters, a quality assurance section, an aircraft maintenance section, and an aircraft component repair section.

(3) The three ATKHCs provide the ATKHB with an antiarmor, anti-personnel, antimateriel, and air-to-air destruction capability. Each company consists of a headquarters section, an aeroscout platoon with four observation helicopters, and an attack platoon with six AH-64s or seven AH-1s.

b. A light infantry division ATKHB is organized the same as a heavy division, except that the light infantry division ATKHB does not have an organic Class I, III, and V resupply capability. The aviation brigade provides Class I, III, and V support. Light division ATKHCs are organized the same as those in a heavy division.

Chapter 2

COMMAND, CONTROL, AND COMMUNICATIONS



The most significant and difficult portion of the employment of the ATKHB is planning and synchronizing the battalion into the battle. This chapter discusses the duties and responsibilities of the commander and his staff, command relationships, planning factors, command posts, and communications.

2-1. COMMAND AND CONTROL ORGANIZATION

a. Commander. The ATKHB commander is responsible for the overall success of the assigned mission. He receives the mission from higher headquarters, decides how battalion assets are to be used, and directs the execution of plans. The commander must position himself where he can best lead the battalion and accomplish the mission.

b. Staff. The ATKHB staff officers and their sections work closely with the battalion commander and the ATKHCs. The staff consists of the primary staff officers (XO, S1, S2, S3, and S4) and their sections. The staff assists the commander by dealing with routine matters and planning and synchronizing battalion assets. FM 101-5 describes the duties and responsibilities of each staff officer. Two staff officers that are key to the battalion's operations are the executive officer and the operations officer.

(1) Executive officer. The executive officer is the principal assistant to the commander and must be prepared to assume command at any time. He also acts as chief of staff for the battalion, maintains control of

the TOC, and ensures coordination between the main CP, the combat trains CP, and the field trains CP.

(2) Operations officer. The operations officer, or S3, is normally located forward with the commander and controls the tactical CP in the forward assembly area. The S3 will sometimes control the battalion's maneuver, depending on the employment method used. Command and control of a mission is usually exercised from the commander's aircraft. When the commander must return to the FARP, the S3 assumes control of the operation until the commander returns. Figure 2-1 shows the rotation of the commander and the S3. If the battalion commander becomes incapacitated, the S3 assumes control of the operation until the battalion XO can prepare, move into position, and assume command of the battalion and control of the operation.

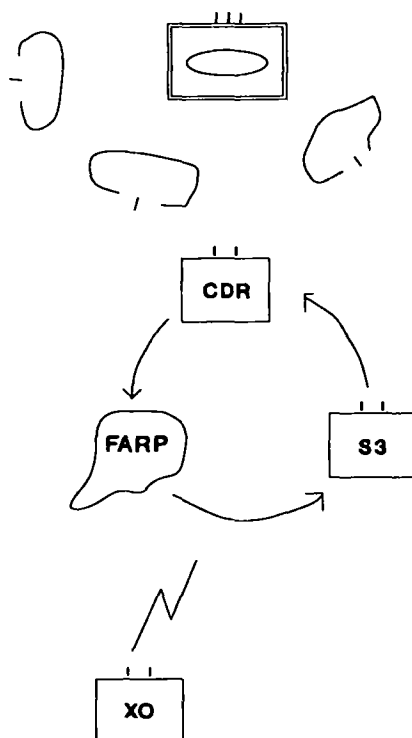


Figure 2-1. Commander and S3 rotation

c. Command Relationships. The command relationships of the ATKHB are organic, assigned, attached, and operational control. ATKHBs are assigned to aviation brigades at theater Army and division levels and to ATKHRs in corps aviation brigades. When the mission dictates, an ATKHB may be attached to a unit that can support its logistical needs. The ATKHB will be placed under OPCON of the gaining unit when the battalion is to be used for a specific mission, the effective time of the relationship is short, or the gaining unit is unable to provide logistics support. Normally, control of the ATKHB

remains with the aviation brigade or ATKHR and shifts to other brigades as an allocation of combat power by division and corps headquarters. When the mission is completed, the ATKHB returns to the control of its parent brigade or ATKHR. Table 2-1 shows the types of command relationships that can be established between an ATKHB and other units. Figure 2-2 shows the relationship of an ATKHB and a maneuver brigade.

Table 2-1. Possible ATKHB command relationships				
GAINING UNIT	ORGANIC	ASSIGNED	ATTACHED	OPCON
Theater Army	Yes	No	Yes	Yes
Corps	Yes	No	Yes	Yes
Division	Yes	No	Yes	Yes
Aviation Brigade	Yes	Yes	Yes	Yes
Ground Brigade	No	No	No	Yes
ACR	No	No	Yes	Yes
ATKHR	Yes	Yes	Yes	Yes
Battalion/Squadron/TF	No	No	No	No

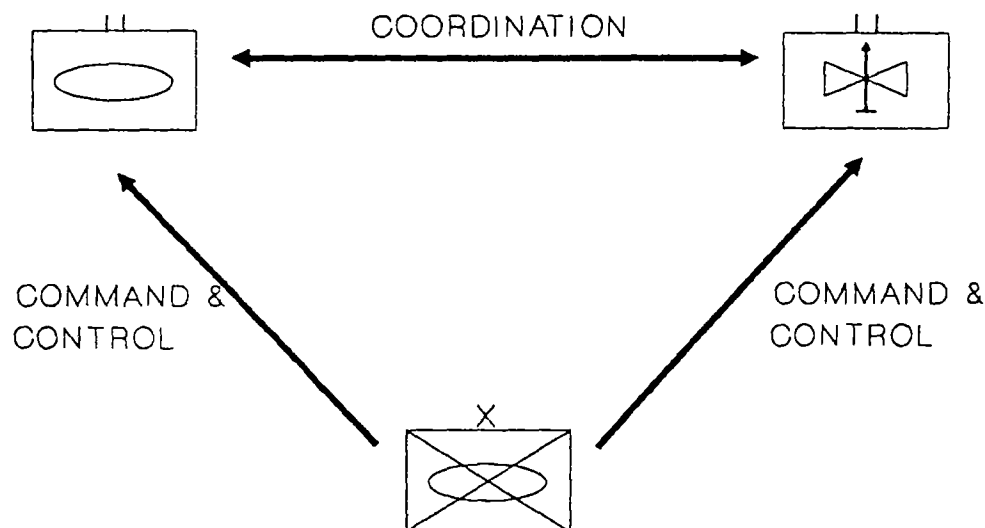


Figure 2-2. ATKHB under OPCON of a ground maneuver brigade

2-2. COMMAND AND CONTROL PROCESS

At any level of command, the C² process provides the commander with the structure and the means to make, convey, and evaluate decisions continuously. These decisions and the higher commander's intent are translated into productive actions. Upon receipt of the mission, the ATKHB uses the decision-making process to evaluate, plan, and accomplish the mission.

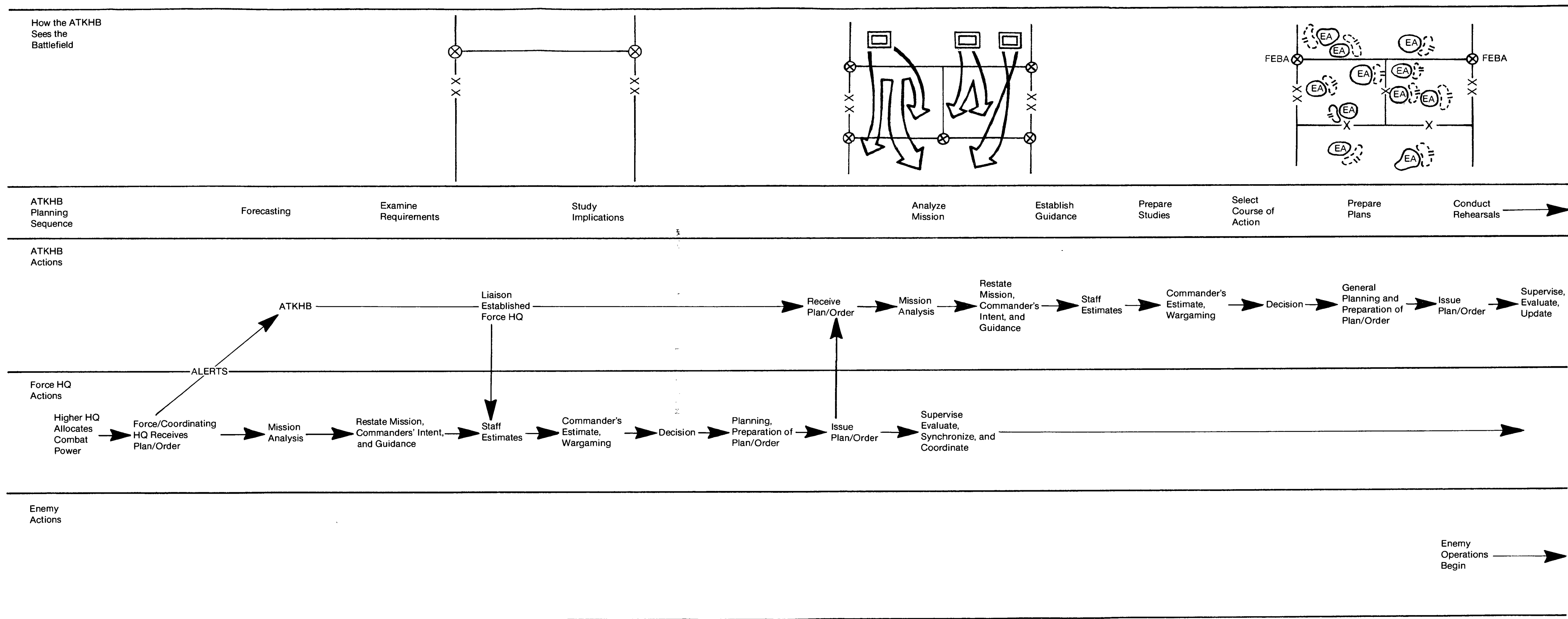


Figure 2-3. Close operations planning sequence

a. Decision Making. Decision making requires an organized effort by the commander, his staff, and liaison officers to reach an effective solution that supports the friendly force commander's intent. The decision-making process begins when the mission is received from higher headquarters and continues until it is accomplished. The decision-making process is covered in FM 101-5.

"Whatever is not considered in depth is without result."
Napoleon

b. Planning. ATKHB operations must be planned in detail. Plans are based on specific conditions or assumptions and are not static. As a result of continuing estimates and studies, plans must be changed, refined, and updated. The ATKHB may have many on-order missions that cover the depth and breadth of the battlefield; therefore, planning is a challenging and never-ending process. To help commanders and their staffs with the planning process, a nine-step planning sequence was developed. It shows a logical progression from a broad view of what the battalion may do to that of a narrow focus of the missions assigned. The planning sequence is shown in Figure 2-3 and is covered in depth in FM 101-5.

(1) Step 1--forecast requirements. In this step, planners analyze and evaluate facts and trends to determine probable requirements. It enables staff planners to predict what may occur so that planning may begin. Planners must answer the following questions: Where will we fight? What is the threat? What missions will we be expected to execute (METL)?

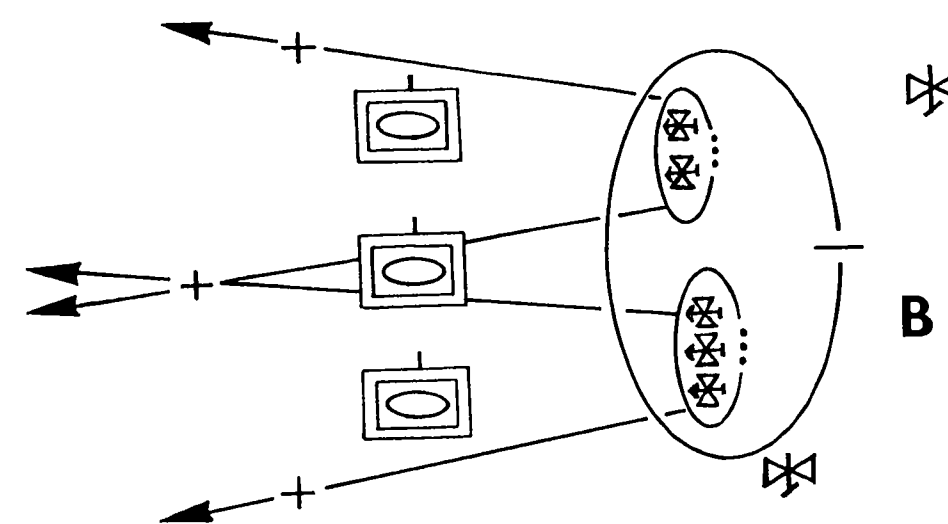
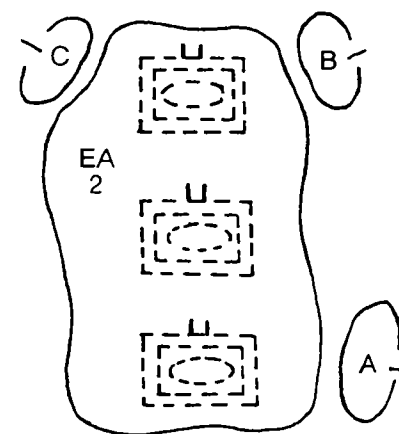
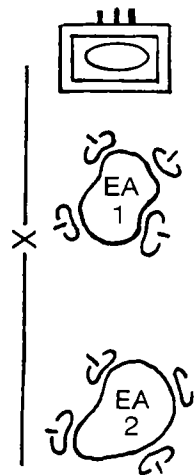
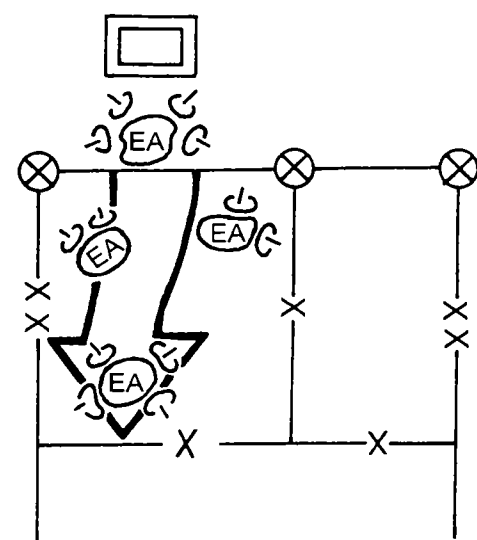
(2) Step 2--examine requirements. This step involves an analysis of the forecasted requirements and assumptions to determine the probability of their occurrence. Depending upon the probability of occurrence, requirements are prioritized for further planning and preparation.

(3) Step 3--study implications. In this step, implications and interrelationships of probable requirements are used to formulate assumed missions. As a mission becomes apparent, the planning sequence parallels the command and staff actions of the decision-making process.

(4) Step 4--analyze the mission. In this step, the mission is analyzed to determine specified, implied, and essential tasks. Upon completion of the mission analysis, the commander restates the mission of the ATKHB.

(5) Step 5--establish guidance. Planning guidance keeps all planners moving in the same direction at the same time. It makes concurrent planning easier by providing the foundation for the staff estimates. Guidance may be an oral planning directive on specific tactics, key factors from the analysis of assigned or implied missions, courses of action, forecasts, or procedures from the commander. Guidance may also be policy statements made by the commander and directives and orders from higher headquarters.

BATTLE



How the ATKHB
Sees the
Battlefield

STARTS

Occupies
Assembly Area,
Continues General
Planning

Intel

Enemy's
Main Effort
Located

Intel

Enemy
Attacks

NAI

Size and
Direction

Window of
Opportunity
Identified

Intel

Begins
Detailed Planning

Issued

Warning
Order

Coordinates,
issues FRAGO

FRAGO

Positive
ID of Target

Intel

Positive
Location and
Direction

NAI

Moves
to HA,
Gains Contact

Execute

Decision to
Use

DP

Enemy Reaches
Decision Point

Occupies
BP

SITREP

Coordinates
Assets

Enemy
Arrives in
EA

Executes

ENGAGEMENT

ATKHB
Actions

Enemy
Actions

These directives and orders include the mission; means available, limiting considerations, special instructions, or SOPs.

(6) Step 6--prepare studies. In this step, staff planners prepare their studies/estimates which lead to the operations estimate. In the operations estimate, several courses of action are presented.

(7) Step 7--select the course of action. In this step, wargaming occurs and the best course of action is selected. Because preparation of all reasonable contingencies is the aim of the planning sequence, consideration of courses of action involves more than the elimination of all but one course of action. Several feasible courses of action may be retained so that the command is prepared for all likely contingencies. In a specific operation, each plan is built on a single course of action. Additional courses of action may be retained for use as alternate plans.

(8) Step 8--prepare plans. In this step, complete plans are prepared. The outlined plan provides a framework from which all details necessary to build a complete plan may be added.

(9) Step 9--conduct rehearsals. A rehearsal should be conducted if time and resources permit. The rehearsal should include all troops and equipment and be conducted under conditions similar to those actually expected.

c. Orders. Orders are written or oral communications that convey information governing the action. Some of the characteristics of a good combat order are clarity, completeness, brevity, and timeliness. Orders are covered in FM 101-5. A detailed sample format for an operations order is contained in Appendix H.

2-3. IPB PROCESS

a. Intelligence preparation of the battlefield is an essential part of staff planning. The IPB process integrates enemy doctrine with the weather and terrain as they relate to the mission and the specific battlefield environment. It provides a basis to determine and evaluate enemy capabilities, vulnerabilities, and probable courses of action. The products created by a thorough IPB are critical to the S2, S3, and commander.

b. Each level of command provides its subordinate units with IPB support and products such as overlays, templates, and enemy estimates. Corps ATKHBs will use IPB products provided by corps, corps aviation brigade, and the ATKHR. Divisional ATKHBs use IPB products provided by corps, division, and the aviation brigade or ground maneuver brigade. Using these IPB products as a basis, the ATKHB S2 conducts his own IPB.

c. The intelligence estimate is the key to the decision-making process. Through IPB, the estimate is presented in a graphic format. It enables the commander and staff to see, rather than visualize, where both friendly and enemy forces can move, shoot, and communicate. It provides a graphic data base for comparing friendly and enemy courses of action. The S2 uses

templating techniques to determine enemy courses of action; the S3 uses them to compare friendly courses of action.

d. The IPB tells the S2 where to look, what to look for, and what he should expect to see. It tells the S3 where and when the battalion may maneuver, shoot, jam, and communicate and what to shoot and jam. It also tells the S3 what results to expect.

e. The IPB is vital to the commander's estimate and his tactical decision regarding the concept of the operation. It helps the commander to compare friendly and enemy vulnerabilities and opportunities accurately. It also helps him to determine where, when, and how to employ the ATKHB to ensure success. More information on the IPB process is found in FM 34-3.

2-4. MISSION STATEMENT FOR AN OPERATIONS ORDER

The ATKHB attacks the enemy to destroy, attrit, and disrupt. It also denies the enemy avenues of approach, overwatches friendly ground forces, and conducts other missions in support of the force. An ATKHB cannot defend in sector or from a battle position. It can, however, use both sectors and battle positions as control measures for its attacks. An ATKHB cannot seize terrain or an objective. It can, however, dominate terrain and deny an objective. Table 2-2 lists ATKHB mission statements that describe the results that a commander desires when he assigns an ATKHB a mission. An example of a mission statement is, "At 221700Z MAR 90, the 112th ATKHB is OPCON to 1st Brigade and occupies forward assembly area (AA 12341234). On order, attacks to attrit the 25th TR in EA Thunder (AA 987123, 123456, 234567, 567890). Upon completion of the mission, returns to assembly area BLUE and returns to control of the aviation brigade."

Table 2-2. ATKHB mission statement		
Desired Results	Description	Risk
Destroy	Kill $\geq$ 70 percent of enemy force	High
Attrit	Kill $>$ 30 percent but $<$ 70 percent	Medium-to-high
Disrupt	Disrupt or delay C ² , maneuver, fire support	Low-to medium
Deny Avenue of Approach (Delay)	Dominate an avenue of approach by fire	Medium-to-high
Overwatch	Hasty attacks to permit ground or air maneuver	Low-to-medium

a. Attack to Destroy. Using an ATKHB to destroy an enemy force is a high-risk operation. However, when given the mission to attack to destroy, the ATKHB will attempt to cause a maneuverability, firepower, or catastrophic kill on more than 70 percent of the enemy force. To achieve such a high percentage of kills, the ATKHB must accept a substantial risk that may involve its becoming combat-ineffective at the completion of the attack. Therefore, the ATKHB must attack the enemy force with enough combat power to achieve the desired results with one mass attack or sustain the attack until the desired results are achieved.

b. Attack to Attrit. An attack to attrit is similar to an attack to destroy, but the ATKHB accepts less risk. When given the mission to attack to attrit, the ATKHB will attempt to kill greater than 30 percent, but less than 70 percent of the enemy force. The greater the enemy force that needs to be killed, the greater the risk the ATKHB must accept.

c. Attack to Disrupt. This is a low- to medium-risk operation. The attack to disrupt is swift and causes the enemy's maneuver formation, logistics, fire support, or command and control to be disrupted or delayed. The force commander sets the amount of risk based on the friendly loss he is willing to accept, the location of the attack, or the number of attacks that will be made. The attack to disrupt is used predominately to conduct spoiling attacks.

d. Deny Avenue of Approach. This is a medium- to high-risk operation and may involve either a ground or an air avenue of approach. The mission is conducted as a delaying operation. An ATKHB may be assigned an avenue of approach into an airhead, the rear area, a flank, or enemy lines of communication. However, denying the enemy LOCs may also require air assault forces. In each case, the ATKHB attacks to deny the enemy the use of the given corridor for an assigned period of time. The risk that the battalion accepts is determined by the amount of time that the ATKHB must deny the avenue, location of the avenue, and enemy force that is encountered.

e. Overwatch. The ATKHB overwatches friendly forces as they conduct passages of lines, river crossings, air assaults, and as they maneuver in a movement to contact. It will position itself where it can make a rapid attack to assist friendly forces to disengage or brush aside enemy forces attempting to disrupt the operation.

2-5. COMMAND AND CONTROL FACILITIES

a. Main Command Post. The ATKHB main CP is the control, coordination, and communications center for combat operations. The main CP is located in or near the battalion assembly area and is composed of the S2 and S3 sections, the FSE (when present), representatives from other attached elements, and the tactical CP (when it is not forward). Main CP vehicles and personnel must be kept to a minimum to allow for rapid displacement; however, a sufficient number must be retained to perform C² functions in support of the commander. The combat trains CP is normally designated as the alternate main CP.

(1) Functions. The main CP monitors and assists in command and control by maintaining contact and coordination with higher and adjacent units and continuously updating the enemy situation. It also plans operations, analyzes and disseminates tactical information, maintains situation maps, and requests and synchronizes additional CS and CSS for the battle. Factors that have immediate operational impact must be monitored by the main CP and communicated to the commander.

(2) Operations. The primary considerations in positioning the main CP are communications, accessibility, and survivability. Personnel who operate the main CP must be organized to maintain the main CP functions and provide security on a continuous basis. A sleep plan must be enforced to preserve the ability of main CP personnel to perform continuous operations. A sample command and control section of an internal SOP is located in Appendix H. Coordination between the main CP, the combat trains CP, and the field trains CP must be continuous to ensure that CSS is integrated into the mission effort. When possible, a landline link is established with the combat trains CP. The security of the main CP is enhanced by its capability to displace rapidly and maintain a small electronic signature. Displacements are planned to ensure that the main CP is stationary during critical phases of the battle. The battalion XO has primary responsibility for the main CP. He is also responsible for coordination between the main CP, the combat trains CP, and the field trains CP. Figure 2-4 shows the locations of the different command posts.

b. Tactical Command Post. When established, the tactical CP is the forward echelon of the ATKHB headquarters. It usually consists of staff elements from the S2, S3, and any fire support control elements attached to the battalion. The S3 is usually located at and has overall responsibility for the tactical CP. The tactical CP is located well forward on the battlefield so that the commander is near his subordinate units and can lead the battalion. The tactical CP is established in or near the forward assembly area. Once the ATKHB has crossed the LD and begun operations, the commander moves to a position from which he can coordinate operations. While the battalion is in the forward assembly area, the S3's and commander's vehicles normally compose the tactical CP. Upon execution of the mission, the command group moves to the S3's and commander's aircraft. Figure 2-4 shows the CP organization and its approximate position on the battlefield.

c. Command Group. The command group consists of the commander and those personnel he selects to go forward to assist him in controlling maneuver and fires during the battle. The command group normally includes the FSO, FAC, and S3. There is no requirement for these people to collocate. For example, the commander and the S3 may fly in different aircraft so that during a continuous mission the S3 will remain on station to control the battle when the commander's aircraft must return to the FARP. To permit optimum command and control of his unit during battle, the commander determines the composition, nature, and tasks of the command group.

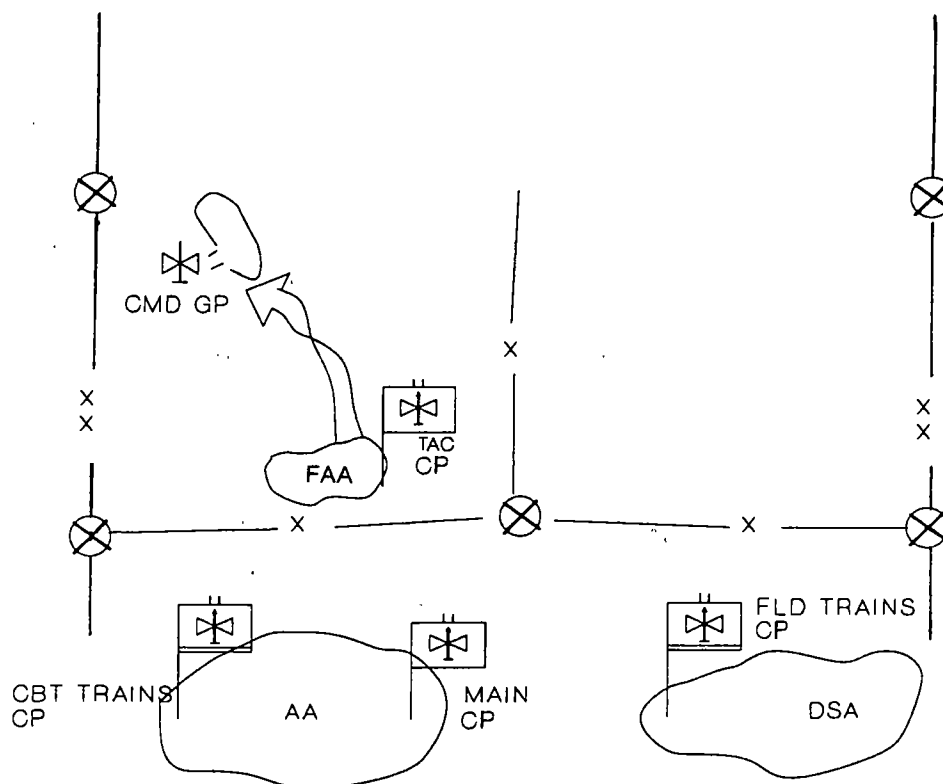


Figure 2-4. CP organization and location

d. Combat Trains Command Post.

(1) The combat trains CP is the coordination center for combat service support for the ATKHB and the control element of the combat trains. It is positioned forward of the field trains, normally in the battalion assembly area and near the main CP, but not collocated with the main CP. Assisted by the S1, the S4 is responsible for operations, movement, and security of the combat trains. The S4, S1, and the AVUM company commander must continually assess the situation, anticipate the needs of the ATKHCs, and ensure timely delivery of vital support. Correctly anticipating requirements is the key to successful combat service support.

(2) The combat trains CP maintains the CSS status of the battalion. In preparation to assume its functions as alternate main CP, the combat trains CP monitors the ATKHB command net and maintains the necessary maps and status records to assume the duties of the main CP quickly.

(3) The main CP or tactical CP should report to the combat trains CP any change in the main effort of the battalion. Similarly, the combat trains CP must immediately report to the main CP any major change in the ability of the CSS system to support an operation. The combat trains CP relays information to the field trains CP.

e. Field Trains Command Post. Field trains are under the control of the AVUM company commander whose headquarters is the field trains CP. When the ATKHB commander collocates his field trains in the CSA or the DSA, the AVUM commander coordinates with the appropriate headquarters for positioning and defending battalion field trains elements.

(1) The field trains CP is composed of the AVUM commander, the AVUM company (minus contact teams that are forward) and the remainder of the S1 and S4 sections. It coordinates the collection and movement of CSS from the battalion field trains and the DISCOM or COSCOM, controls unit-level aircraft maintenance, oversees the acquisition of Class IXA repair parts, and evacuates aircraft to AVIM.

(2) Supplies, personnel, and mail going forward from the field trains are grouped into logistics packages under the control of the HHC commander. The field trains CP organizes and dispatches LOGPACs based on instructions from the combat trains CP.

(3) Battalion trains are normally echeloned with both a combat trains CP and a field trains CP. The alternative configuration is to form unit trains with a single rear CP, or administrative and logistics operations center, which is operated by the S4. When only a rear CP is formed, no field trains CP is established.

2-6. ARMY AIRSPACE COMMAND AND CONTROL

The ATKHB must successfully coordinate the employment of the battalion according to the A²C² plan. The battalion must fully use the existing command and control structure to reduce the risk of engagement by friendly air defense forces and avoid conflicts with other airspace users. Each company must adhere to procedural control measures established by division or corps. The ATKHB tactical operations center must establish and maintain a continuous link with A²C² elements at the aviation brigade. This provides for rapid dissemination of information, which affects the ability of the ATKHB to carry out its mission. To prevent conflicts throughout the operation, the A²C² element should provide all pertinent airspace information during planning. A²C² planning is covered in FM 100-103.

2-7. LIAISON

Liaison with supported units is required and aids in ensuring that the ATKHB is effectively synchronized into the battle. When the ATKHB is attached to or under OPCON of another maneuver headquarters, aviation commanders are the most effective liaison officers, especially during the planning process. However, this is often not practical because commanders are not always available. The liaison officer must assist the supported commanders and the ATKHB commanders to anticipate requirements, plan future operations, and coordinate support. The primary duties of the LO are to--

- Ensure proper synchronization during mission execution.

- Recommend courses of action within the capabilities of the ATKHB.
- Act as the ATKHB commander's representative to higher headquarters.
- Ensure proper integration of the battalion within the scheme of maneuver.
- Advise the force commander on all matters concerning the employment of the ATKHB.
- Maintain availability and status of the number and type of operational aircraft for the supported commander.
- Ensure that intelligence and fire support requirements are coordinated and synchronized with higher headquarters.
- Keep the ATKHB commander abreast of the current situation and any intelligence information that projects the enemy's likely courses of action.
- Coordinate with the force A²C² element on the status of tactical operations, the location and status of ATKHB assets, and all other information that affects the use of airspace. (FM 100-103 contains information about A²C² duties of aviation LOs when they are working with a brigade headquarters.)

2-8. COMMUNICATIONS

a. Successful employment of the ATKHB depends on its ability to communicate with all echelons. The primary means of tactical communications within the ATKHB is the FM-secure net. The use of UHF and VHF radios in battalion aircraft helps reduce the load on the FM-secure nets. These radios are primarily used by the companies to control the platoons. The ATKHB commander normally communicates from his aircraft to higher headquarters using the FM-secure net. The battalion command net is also FM-secure; however, this requires that the commander relay messages to higher headquarters through the TOC, or tactical CP, or change frequencies when communications are necessary with higher headquarters. Figures 2-5 and 2-6 show radio links.

b. The wire-laying capability of the ATKHB is limited. However, it will establish, within its capability, a wire communications net in the assembly area. This wire network links the TOC with elements of the HHC, the AVUM company, and ATKHCs. Figure 2-7 shows a battalion wire net.

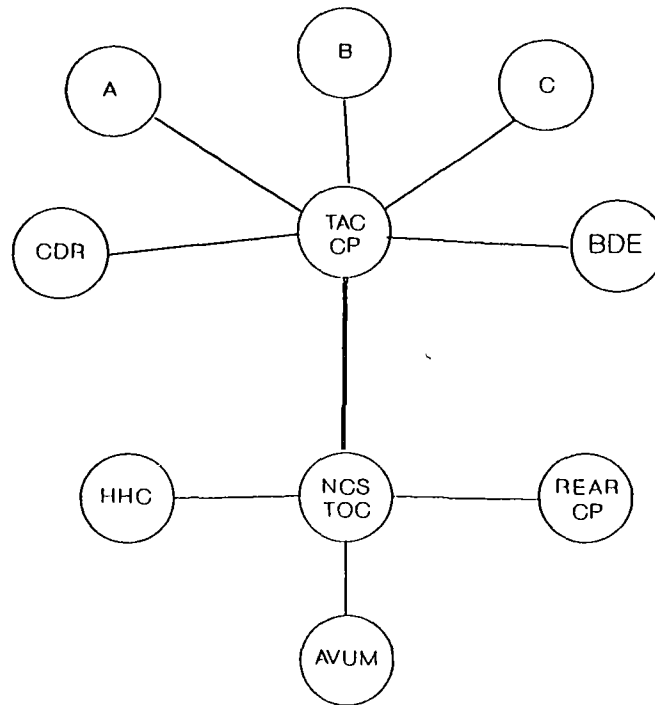


Figure 2-5. Battalion command FM net (secure)

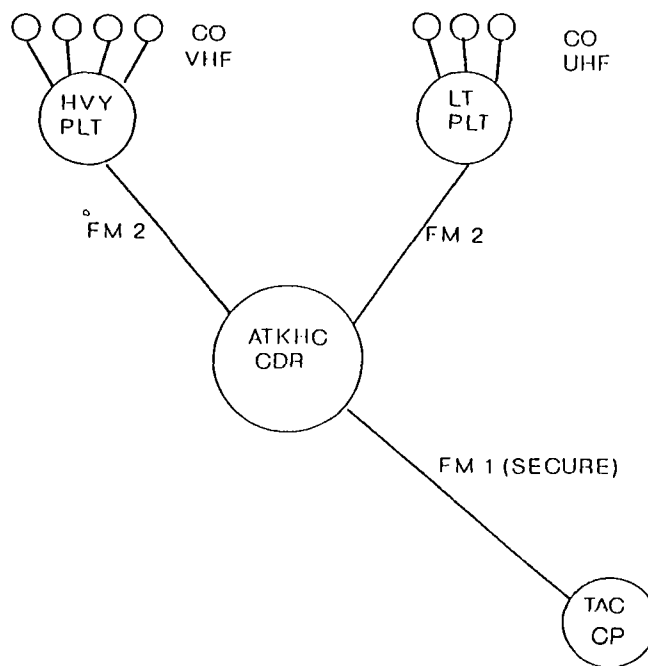


Figure 2-6. Company nets

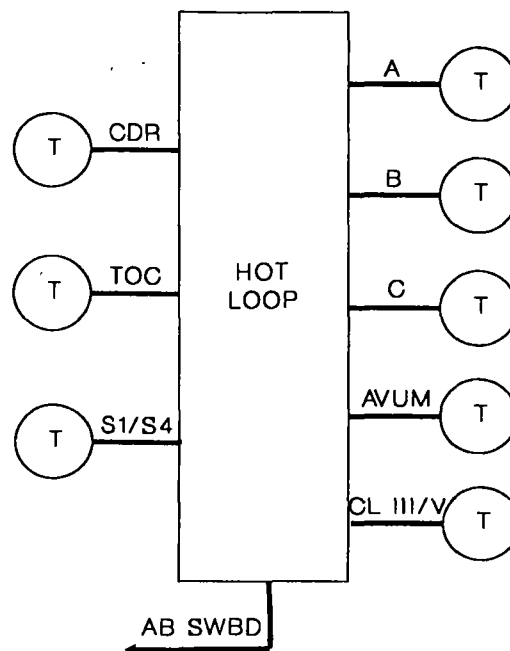


Figure 2-7. Battalion wire net

2-9. OPERATIONS SECURITY

Security measures must be taken during any military operation to deny the enemy information about friendly forces. The OPSEC concept includes all security measures that allow units to surprise or deceive the enemy. Operations security includes physical security, information security, signal security, and deception and countersurveillance activities. Because these categories are interrelated, the ATKHB commander normally chooses to employ more than one security technique to counter the Threat. He may also use SIGSEC programs such as EW and SIGINT. By analyzing hostile intelligence efforts and vulnerability, executing OPSEC countermeasures, and surveying the effectiveness of countermeasures, the ATKHB commander can counter specific hostile intelligence efforts. Aviation operations security is described in detail in FM 1-100.

2-10. READINESS CONDITIONS

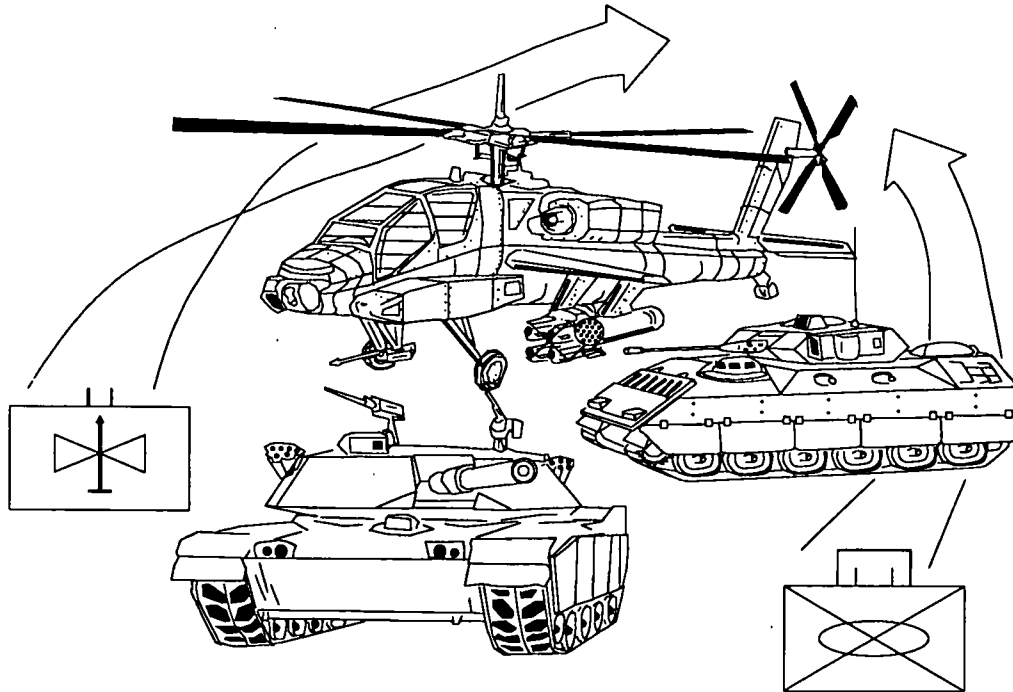
ATKHBs conduct operations as a maneuver element, executing specific missions for the force commander. A mission assigned to an ATKHB may require all or only part of the combat power of the battalion. The ATKHB commander must plan the battalion's recovery and maintenance cycles to vary from its projected mission times. To allow the battalion time to rest and perform maintenance, the ATKHB commander uses readiness conditions. Table 2-3 shows an example of readiness condition codes that are a normal part of the ATKHB tactical SOP. The entire battalion may be at the same readiness condition, or each ATKHC may be at a different readiness condition. An ATKHB organizes its readiness conditions based on the factors of METT-T.

Table 2-3. Aircrew readiness conditions

LVL	RESPONSE TIME	AIRCRAFT	ENGINES	APU	AVIONICS	WEAPONS	COMMO	AIRCRAFT PREPARATIONS
	IMMEDIATE	OH	FULL RPM		ALL ON		INTERNAL	
1	TAKEOFF	AH	BOTH FULL RPM		ALL ON/HARS ALIGNED	ALL INITIAL'D	INTERNAL	
	FIFTEEN	OH	SET FOR CRANK		OFF		PRC-77	THRU-FLIGHTED
2	MINUTES	AH	SET FOR CRANK	ON	ALL ON	OFF	INTERNAL	THRU-FLIGHTED
	THIRTY	OH	SET FOR CRANK		OFF		PRC-77	PLTS ON STBY/1 ON RTO
3	MINUTES	AH	SET FOR CRANK	OFF	OFF	OFF	PRC-77	PLTS ON STBY/1 ON RTO
	ONE	OH		OFF	OFF			THRU-FLIGHTED/CREWS BRP
4	HOOR	AH		OFF	OFF	OFF		THRU-FLIGHTED/CREWS BRP
	TWO	OH		OFF	OFF			THRU-FLIGHTED/CREWS BRP
5	HOURS	AH		OFF	OFF	OFF		THRU-FLIGHTED
	MORE THAN	OH		OFF				PLANNING NEXT MISSION
6	TWO HOURS	AH		OFF	OFF	OFF		PLANNING NEXT MISSION

Chapter 3

EMPLOYMENT



This chapter implements portions of STANAG 2019 and QSTAG 509, STANAG 2868, STANAG 2999, and QSTAG 277.

Attack helicopter battalions must be prepared to conduct engagements across a wide front. These extended engagements must be preplanned and coordinated based on the factors of METT-T, which govern how and when the ATKHB commander employs his battalion. This chapter is divided into three sections. Section I discusses the task organization and roles of the ATKHB; Section II discusses the battlefield environment and how it affects ATKHB employment and capabilities; Section III discusses the role of the ATKHB as a member of the combined arms team during combat operations.

Section I

ORGANIZATION AND ROLES

3-1. ORGANIZATION

a. ATKHB. The ATKHB is task-organized according to the factors of METT-T. As the situation dictates, the aviation brigade commander can

organize the ATKHB along with other assets to form task forces to better perform specific missions.

(1) Pure. To take advantage of its speed and mobility against armored forces, the ATKHB fights pure. When commanders desire to emphasize the shock and killing effect of massed attack helicopter battalions, they will use the organic structure of the battalion.

(2) Task force. To increase the lift capability of an ATKHB, the brigade commander can attach a platoon of assault helicopters from an assault helicopter company. Figure 3-1 shows additional lift assets attached to an ATKHB. The addition of extra utility helicopters enables the ATKHB to increase its capability to move Class III/V supplies by air. ATKHCs may be placed under OPCON of or attached to other aviation units depending on the duration of the commitment. When there is a constant requirement for attack helicopters to provide security for assault helicopters, the aviation brigade commander task-organizes both the ATKHB and assault helicopter organizations by moving elements between the two. Figure 3-2 shows two task forces formed in a heavy division. When creating two task forces, the aviation brigade commander trades the ability to mass his attack helicopters for better security for his assault helicopters. When attack helicopter companies are attached to assault helicopter units to form task forces, sufficient Class V and armament support must also be attached. ATKHBs may also form task forces with ground forces. Ground maneuver units may be placed under OPCON of the ATKHB to perform specific missions. Normally, however, this task organization is not reciprocal. The ATKHB may receive ground companies but will seldom place an ATKHC under OPCON of a ground maneuver battalion. Such action would piecemeal the battalion, and an ATKHC cannot support itself.

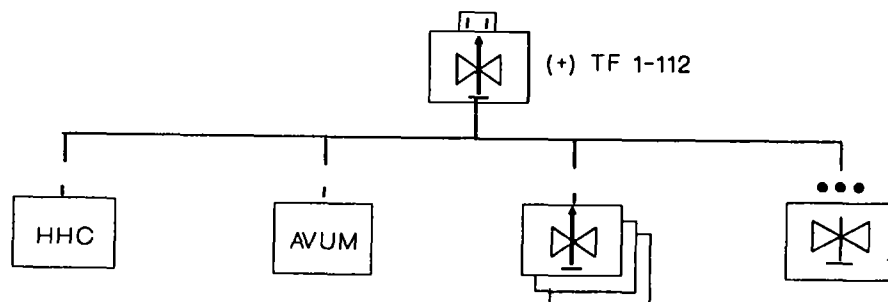


Figure 3-1. ATKHB with additional lift assets

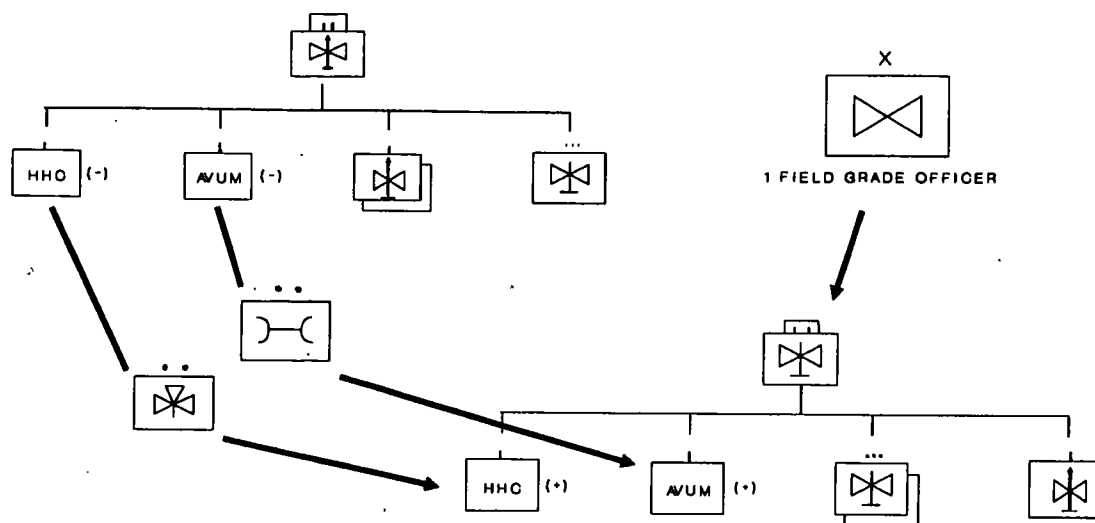


Figure 3-2. Two task forces formed in a heavy division

(3) Augmented. At times, an ATKHR commander or a brigade commander may be required to reinforce an attack battalion with an additional attack helicopter company or a ground maneuver company (Figure 3-3). An ATKHB can control up to five maneuver companies.

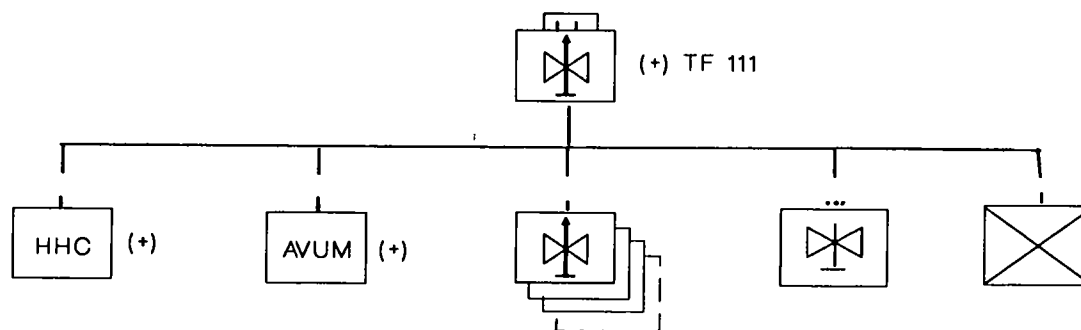


Figure 3-3. Augmented ATKHB

b. ATKHC. Attack helicopter battalions are internally organized into ATKHCs. To make training and maintenance easier, these companies are organized into an aeroscout platoon and an attack platoon. An ATKHC has a standard chain of command that leads and fights the unit as a company. The chain of command includes a company commander and two platoon leaders. The battalion assigns the ATKHC specific missions as part of the battalion's plan of attack. The ATKHC commander task-organizes his company for combat based

upon the factors of METT-T. There is no single method to task-organize an ATKHC. Company commanders must see the battlefield and adjust for conditions and the availability of aircraft when deciding on how to organize for combat. However, the organization of ATKHC assets is based on pairs of aircraft operating together to provide mutual security. When task-organizing the company, the ATKHC commander will always attempt to create a balance between the combat power necessary to accomplish the mission and the need to provide security for each aircraft and the company as a whole. Below are several examples of how an ATKHC may be task-organized for combat.

(1) Heavy/light platoon. When a company is organized into a heavy and a light platoon, the same aeroscouts remain with the same platoon throughout the mission. Each platoon is made up of lead/wingman teams that always move together. These teams may be made up of two attack aircraft, two observation aircraft, or an observation and an attack aircraft. Figure 3-4 shows an ATKHC task-organized into a heavy and light platoon.

NOTE: The terms "heavy" and "light" refer to the mission and weapons load of the attack aircraft, not the number of aircraft. Heavy platoon/section aircraft will normally be fitted with more ATGMs and attack point targets. Light platoon/section aircraft will be loaded with more rockets, cannons, and other munitions and will attack area and soft targets.

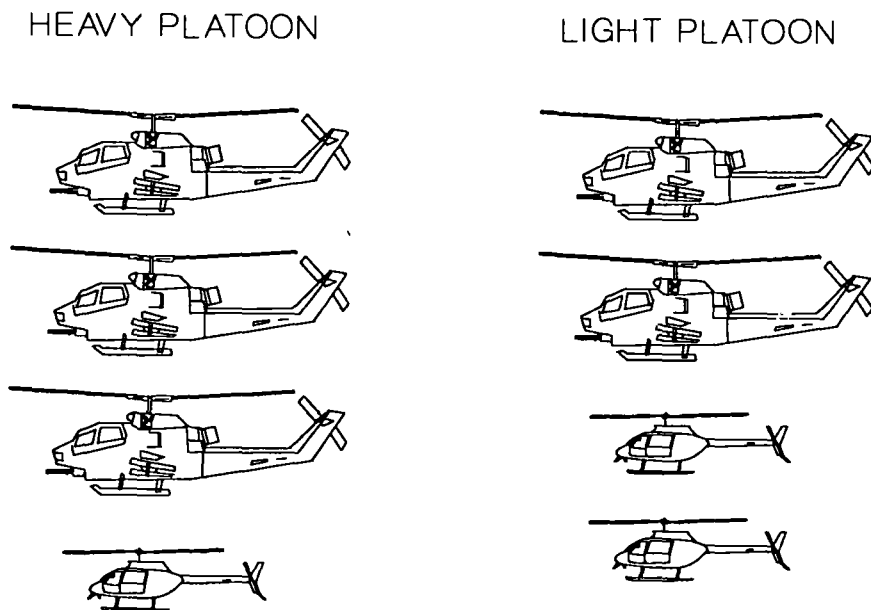


Figure 3-4. ATKHC task-organized into a heavy and light platoon

(2) Heavy/light attack sections with an aeroscout platoon. The ATKHC commander may task-organize the company into three maneuver formations so that the aeroscout aircraft can work autonomously. He task-organizes the

company into a heavy section, a light section, and an aeroscout platoon. When the ATKHC is organized in this manner, aeroscouts will not establish a habitual relationship with either attack section but will conduct reconnaissance and other missions for the company as the commander directs. The aeroscout platoon reconnoiters alternate and supplemental battle positions, screens the flank of the company's route and position, provides liaison, and mans passage points. Figure 3-5 shows an ATKHC task-organized into a heavy and a light section within an aeroscout platoon.

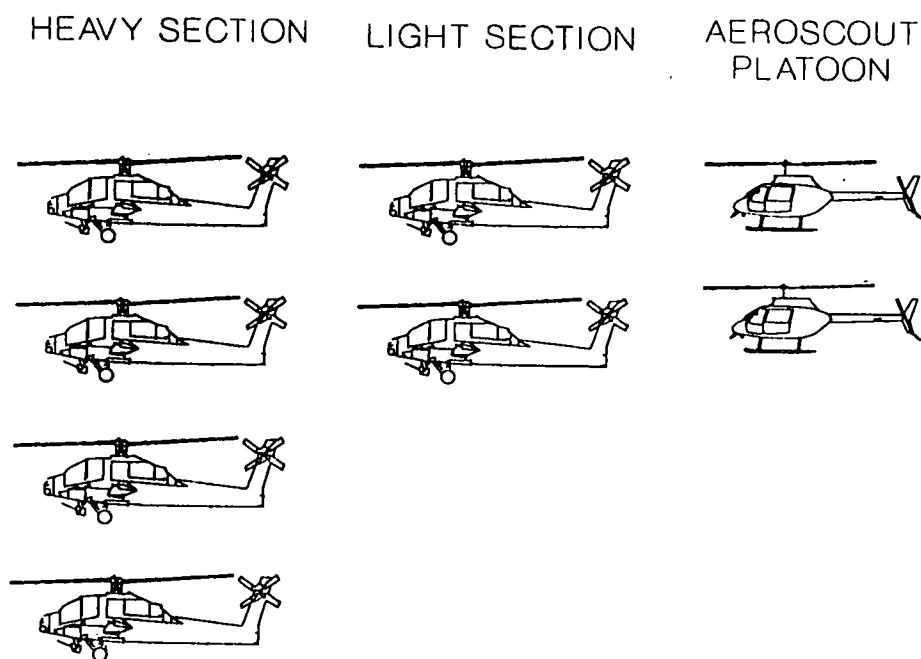


Figure 3-5. ATKHC task-organized into sections

(3) Heavy/light attack sections without an aeroscout platoon. At times, the ATKHC may be employed without the aeroscout platoon, reaping the full benefits of the speed of the AH-1 and the speed and limited visibility capabilities of the AH-64. Although the company operates without its aeroscout platoon, the mission of the aeroscout must still be accomplished. Figure 3-6 shows an ATKHC task-organized into heavy and light sections.

(4) Lead/wingman teams. Lead/wingman teams are used internally in platoons or sections to provide security. Besides using L/W teams within platoons or sections, the ATKHC commander may organize the company into three L/W teams. This organization allows greater freedom of maneuver and maximum employment flexibility. Each L/W team is made up of two attack aircraft that operate together to attack the enemy and provide security for each other.

The aeroscout platoon may or may not be used as described in (2) and (3) above. Figure 3-7 shows an ATKHC task-organized into lead/wingman teams.

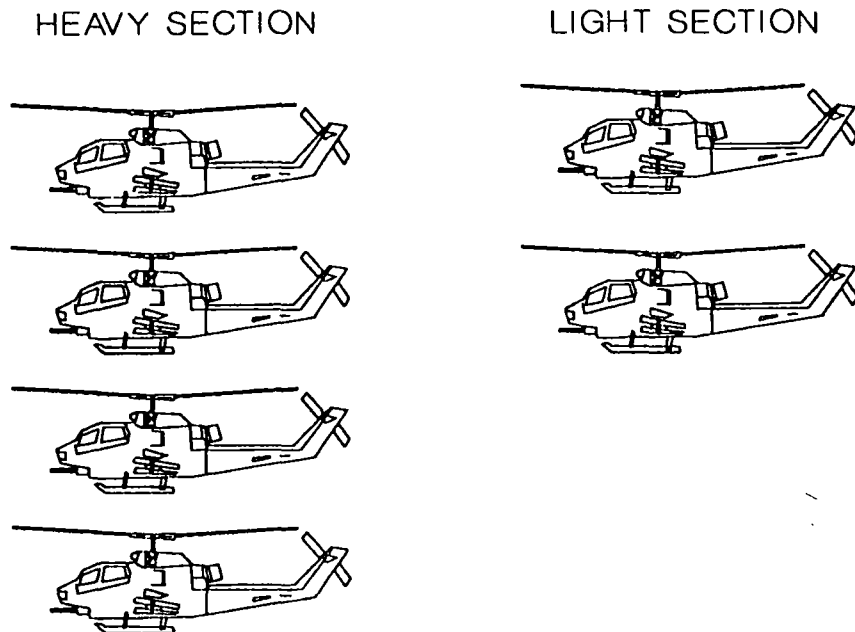


Figure 3-6. ATKHC task-organized into sections without aeroscouts

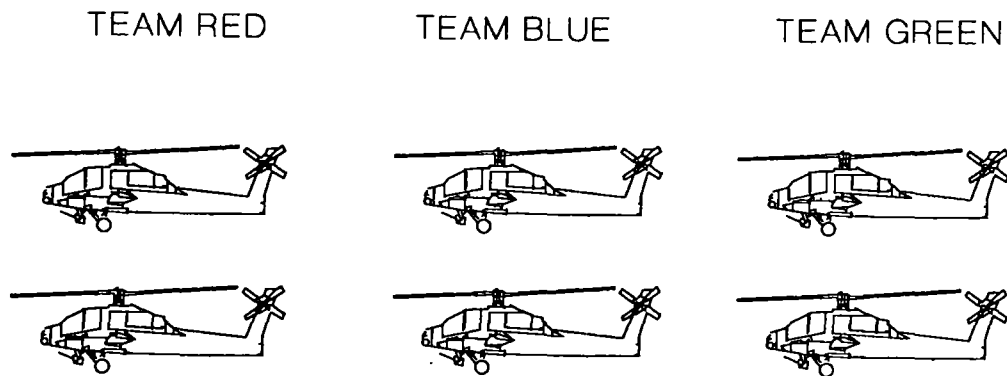


Figure 3-7. ATKHC task-organized into lead/wingman teams

3-2. ROLES

Regardless of the overall mission, the role of the ATKHC is to plan and conduct hasty and deliberate attacks. The ATKHC may also perform reconnaissance and security operations. During air assault operations, ATKHCs may also provide air assault security.

a. ATKHC Commander. The ATKHC commander is responsible for everything that his company does and fails to do. He fights the battle. The commander establishes attack priorities, plans and directs fire distribution, and controls supporting fires. He normally operates from an attack aircraft and maneuvers attack and aeroscout assets during an engagement. The ATKHC commander--

- Receives the mission from the battalion.
- Task-organizes the company.
- Provides detailed planning guidance to crews.
- Coordinates with supported ground units.
- Confirms battle positions for the company and selects platoon battle positions.
- Plans routes to the holding area and battle position.
- Coordinates indirect fire support and close air support.
- Keeps the battalion informed through situation, spot, and battle damage assessment reports.
- Plans for local security in the assembly area, the forward assembly area, and holding areas en route and in the battle position.
- Plans the engagement from the battle position and makes a detailed preparation of the engagement area.
- Controls the joint air attack during company-level JAAT operations.
- Controls company fires.
- Coordinates battle handover and receives a briefing from the unit to be relieved.
- Briefs the incoming ATKHC commander during relief on station.
- Maneuvers the company to the FARP and controls refueling and rearming operations.
- Conducts the debriefing.
- Prepares for the next mission.

b. Platoon Leader. ATKHC platoon leaders are responsible for leading their platoons. The platoon leaders are critical to the successful

employment of the ATKHC. When the platoon is task-organized, the platoon leaders control a platoon, section, or a team. Platoon leaders--

- Assist in planning company missions.
- Control the fire and maneuver of their platoons, sections, or teams.
- Fight their own aircraft.
- Assist the ATKHC commander, at his direction, to execute missions listed in (a) above.

c. Aeroscout. The mission of ATKHC aeroscouts is to see the battlefield, find the enemy, coordinate its destruction, and provide security against ground and air threats. Normally, aeroscouts in each task-organized platoon accomplish the scouting tasks. However, when the aeroscouts do not accompany the ATKHC, the attack helicopter aircrews must perform the scouting tasks. Regardless of what aircraft is used, the mission of the aeroscout must be performed. The aeroscout--

- Requests and adjusts indirect fires and CAS.
- Provides early warning and confirms battle positions.
- Coordinates operations and develops the enemy situation.
- Assists the company commander in controlling JAAT operations.
- Assists with the movement of attack helicopters to battle positions.
- Designates targets for acquisition and engagement of laser-guided munitions (if the aeroscout aircraft are equipped with laser designators).
- Hands over targets (verbally, visually, or digitally) to attack helicopters.
- Maintains enemy contact as attack helicopters move between battle positions.
- Acquires, identifies, reports (using the acronym SALUTE), and designates targets.
- Provides attack helicopters with local security and protection from air threats while they engage targets.
- Assists attack aircraft by confirming or selecting firing positions that provide concealment and standoff ranges.

d. Attack Helicopters. The strength of the ATKHB is in the speed, mobility, and firepower of its attack helicopters. Attack helicopters destroy enemy maneuver forces and their supporting systems. While attack

helicopter operations involve many activities, aircrews routinely perform tasks related to a specific sequence of events. An attack helicopter crew uses the following sequence to engage an enemy force. The attack helicopter crew--

- Moves to the holding area.
- Coordinates with the aeroscout.
- Moves to the battle position, selects the firing position, and receives the target handover from the ATKHC commander or aeroscout.
- Acquires and engages the target.
- Moves to an alternate position and reengages.
- Moves to a successive or supplementary position or holding area or returns to the FARP.

3-3. OPERATIONAL TERMS

a. Assembly Area. An assembly area is a location where the ATKHB prepares for future operations, issues orders, accomplishes routine maintenance, and completes Class I, III, and V resupply activities. The battalion main CP is located in or near the assembly area. Assembly areas should be located out of enemy artillery range and be large enough for dispersion of the unit. Assembly areas are normally located in the corps or division rear area and in the aviation brigade assembly area. However, corps and division aviation brigade assets are normally dispersed over large areas to preclude their becoming lucrative nuclear or chemical targets. Assembly areas will not be located along the enemy's axis of advance. Other considerations involved in selecting appropriate assembly areas are--

- Security.
- Concealment.
- Accessibility to MSRs.
- Air avenue of approach.
- Location of friendly units.
- Suitability of ingress and egress routes.

b. Forward Assembly Area. An ATKHB occupies forward assembly areas for extended periods while awaiting orders to execute the missions. Forward assembly areas are located near the controlling headquarters to improve C³I and response times. The forward assembly area should be located out of range of enemy medium artillery. Limited maintenance personnel may be located in the forward assembly area as contact teams jump forward to repair aircraft.

Considerations for selecting forward assembly areas are the same as those for selecting assembly areas.

c. Holding Area. A holding area is a covered, concealed position that is occupied for short periods. Occupation of a holding area allows for final reconnaissance and coordination of assets by the ATKHC commander. It is located between the forward assembly area and the battle positions. While occupying a holding area, aircraft may be hovered or landed but they will not be shut down. If attack helicopter crews must wait longer than a few minutes, they should consider moving to an alternate holding area or returning to the forward assembly area. Units that occupy holding areas should ensure that--

- Aircraft maintain operating RPM.
- Crews maintain listening silence.
- Separate holding areas are established for each company.
- Aircraft remain at NOE altitudes at and near the holding area.
- Aircraft establish positions which provide 360-degree security.
- The holding area is terrain-masked and free of sources of rotor wash signature.
- Copilots-gunners dismount for face-to-face coordination with the ATKHC commander and aeroscouts.
- Aircraft are dispersed and maintain platoon/section integrity while keeping intervisibility for security.

d. Attack Route. Attack helicopters move from the HA to the BP over attack routes. Properly selected attack routes allow attack helicopters to move undetected, ensuring initial surprise in the attack. Aeroscouts select attack routes that provide cover and concealment and have prominent terrain features to assist in navigation. When used properly, vegetation and various terrain features can reduce helicopter noise and decrease the possibility of detection. ATKHCs may have multiple ingress and egress routes.

e. Battle Position. The ATKHC engages targets from concealed battle positions designated in the OPORD or FRAGO. The ATKHC commander uses information from the aeroscouts to confirm battle positions and assign platoon battle positions and sectors of fire. The ATKHC is dispersed in a battle position based on terrain. Aeroscouts maintain contact with the targets and call up attack helicopters as enemy forces come into range, which reduces the exposure time of the attack helicopters. As the attack helicopters engage targets, aeroscouts provide security and early warning by observing ground and air avenues of approach into the battle position. Battle positions and their preparation are described in Appendix A. Figure 3-8 shows the basic layout of the battlefield.

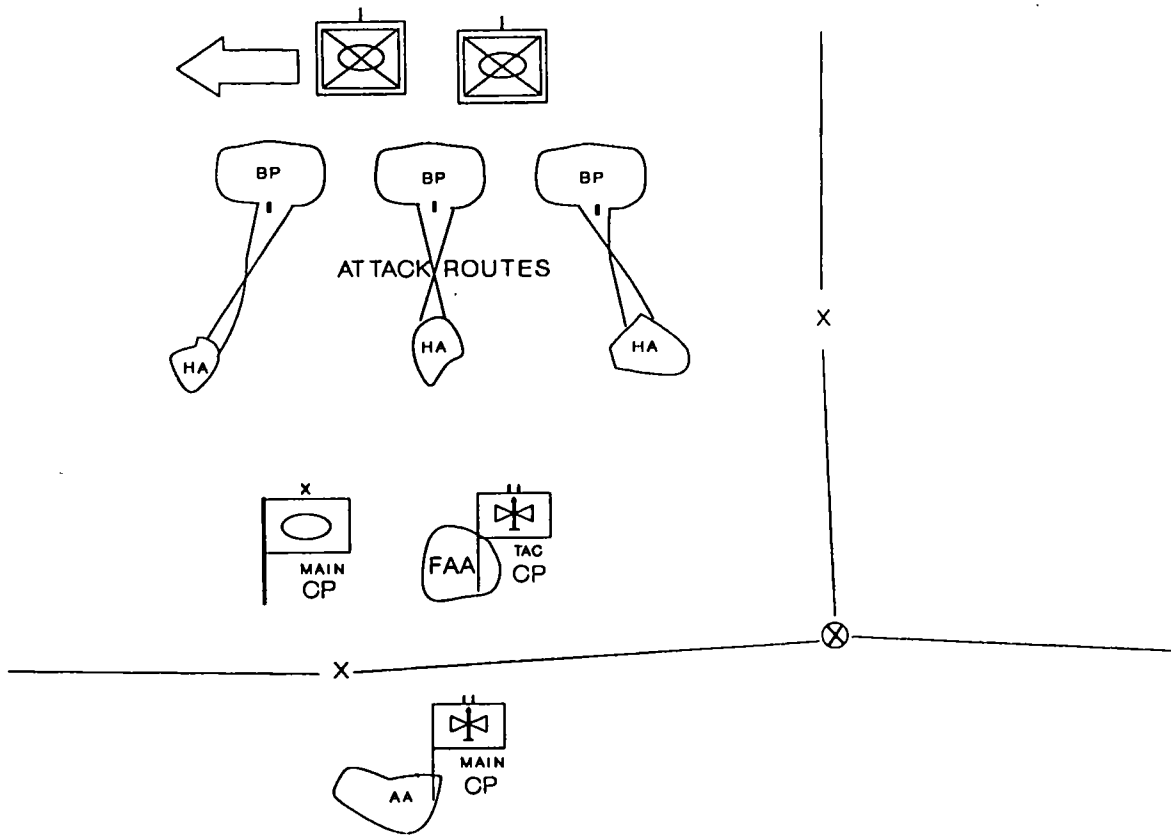


Figure 3-8. Basic battlefield layout

f. Firing Position. Attack helicopter PCs select the actual firing positions that provide standoff ranges and good fields of fire. Ingress and egress routes should be well-concealed, and the background of the firing position should reduce the risk of visual acquisition by the enemy. Selected firing positions must also allow freedom of movement for the attack helicopters and permit them to be hovered without raising dust or debris. To increase aircraft survivability, attack helicopter aircrews should limit their engagements from a single firing position and move before they receive effective counterfire.

g. Engagement Area. The engagement area is an area in which the commander intends to trap and destroy an enemy force with the massed fires of all available weapons. Commanders must use obstacles, fire support, fire distribution plans, and a thorough IPB to coordinate both combined and joint fires and mass them against the enemy force as it arrives in the engagement area. To exploit enemy weaknesses and maximize the advantages of terrain, battle and firing positions are selected in relation to engagement areas. A good engagement area should have at least four characteristics.

h. Rally Point. A rally point is a designated area where separated or dispersed elements of the ATKHC reassemble. It may be used to re-form the light and heavy sections after an attack or to regroup a section, platoon, or company after a hasty withdrawal from untenable battle positions.

(1) Battle positions. The engagement area should have several battle positions for attacking the enemy from various directions.

(2) Obstacles to movement. Obstacles are desirable in the engagement area to slow target movement and permit the effective use of direct and indirect fires.

(3) Long-range fires. To enhance aircraft survivability, an engagement area should allow aircrews to engage targets at the maximum range that permits a high probability of kill.

(4) Continuous target visibility. Long-range engagements require that the target be in view during terminal guidance. As a rule, engagement areas should provide an unobstructed view of the target from firing or designating positions.

3-4. EMPLOYMENT METHODS

The ATKHB commander employs the battalion through the coordination of his ATKHCs, combat support, and combat service support. The ATKHB commander uses his companies to destroy enemy forces. To do this, he applies one of the following three methods of employment: continuous attack, phased attack, or maximum destruction. Timing is critical in the employment of the ATKHB. Employed too early, it may have to be disengaged before mission completion because of low fuel or ammunition. Employed too late, it may miss part or all of the targeted unit and fail to destroy the enemy forces at the critical time and place. The ATKHB should be employed when a lucrative target, such as a tank or a motorized rifle battalion or regiment, has been identified.

a. Continuous Attack. To exert constant pressure on the enemy force, the ATKHB commander employs the ATKHCs using the continuous attack method. This method ensures that at least one company will be in the battle. While one company is in the battle, the other two prepare to relieve the engaged company as they remain in holding areas or the FARP or move between the FARP and the battle. This is called the one-third rule. Many times during a continuous attack the ATKHC commander on station may send only the attack helicopters to rearm and refuel. This allows the aeroscouts to remain in enemy contact, coordinate with the relieving ATKHC commander, and reconnoiter successive battle positions. Multiple battle positions, which are selected during mission planning, provide the flexibility needed for a coordinated battle handover between companies. The continuous attack method provides the most flexibility and the most efficient FARP operations. It also provides sustained antiarmor fires over long periods. Figure 3-9 shows the continuous attack method.

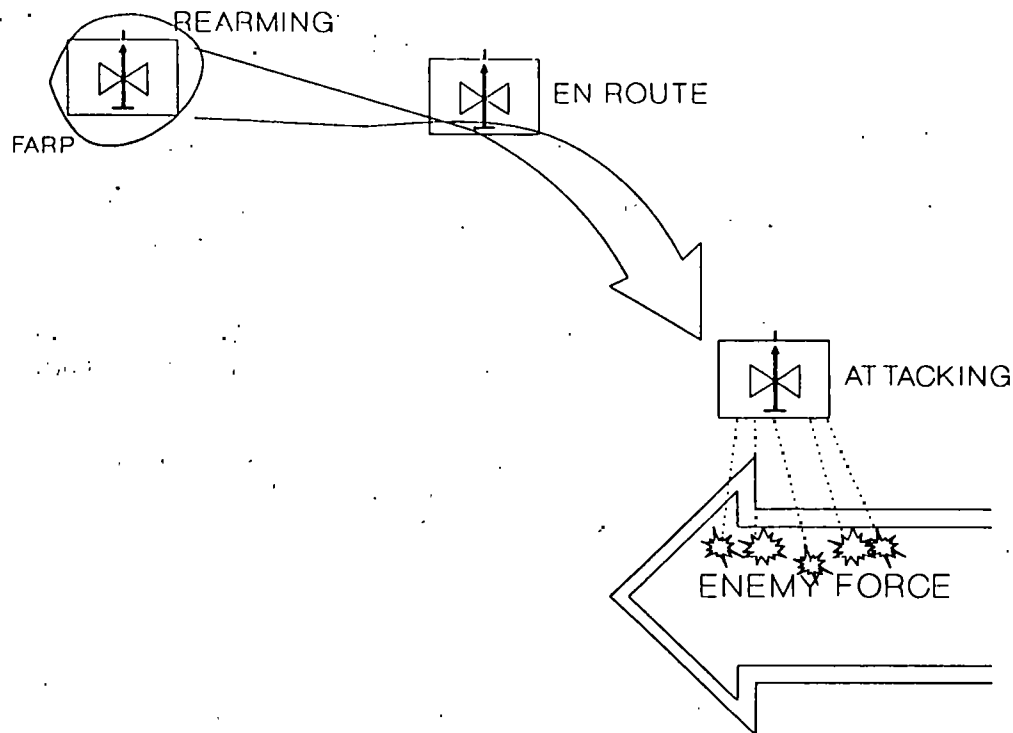


Figure 3-9. Continuous attack method

b. Phased Attack. The phased attack method is a modification of the continuous attack method and is used to increase the initial firepower of the battalion. Using this method, the commander initially employs one company to begin the attack. He then quickly phases in the second company from a different battle position. The third attack company is phased into the fight when either of the other companies is low on fuel or ammunition. The phased attack method may be reversed, or the commander may vary how the phased attack is conducted. For example, he may employ one company to set up the fight and then exploit the attack with his other two companies. If the phased attack method is used, aircraft turnaround time in the FARP must be kept as short as possible. Because of FARP limitations, eventually the phased attack method reverts to the continuous attack method. Figure 3-10 shows the phased attack method.

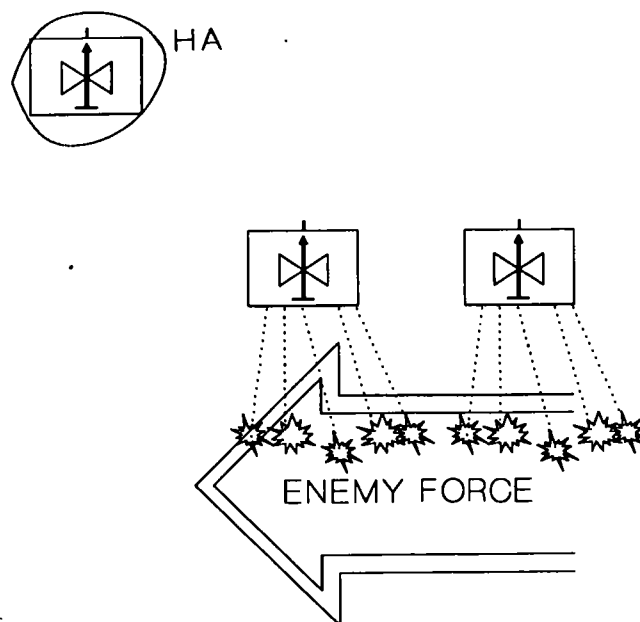


Figure 3-10. Phased attack method

c. Maximum Destruction. If the ATKHB commander wishes to place as much combat power as possible into the battle, he uses the maximum destruction method. To overwhelm the enemy with massed fires, the battalion deploys with all three companies in contact from different battle positions. In this situation, the supported commander must realize that the ATKHB will be out of the fight for 20 to 90 minutes at the completion of its initial attack. The exact time depends upon the distance to the FARP and the time it takes to replenish fuel and ammunition after the initial engagement. Figure 3-11 shows the maximum destruction method.

3-5. FIRE CONTROL

Fire control is critical for mission accomplishment. It consists of the fire distribution plan and attack priorities and allows the commander to direct fires at selected targets and areas that correspond to the OPORD and the commander's intent.

a. Fire Distribution. Fire distribution is controlled at battalion, company, and platoon levels. The ATKHB fire distribution plan defines how the battalion will engage the enemy. The ATKHB uses battle positions, company sectors, separate engagement areas, and priorities of fire support to control the fires of its companies. The ATKHC fire distribution plan distributes the fires of the platoon into specific sectors of fire, which correlates with the ATKHC IPB, scheme of maneuver, and attack priorities. The fire distribution plan of a platoon further breaks down the sectors of fire that the ATKHC assigns to the platoon.

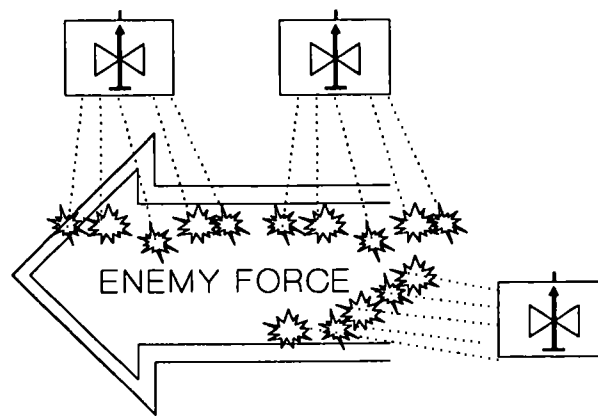


Figure 3-11. Maximum destruction method

(1) The ATKHB commander determines how and what resources are necessary to attack the enemy and allocates combat power through the use of employment methods. The combat power that is necessary at a particular point is then coordinated through the use of separate battle positions or engagement areas. When there is a large area to be covered or maneuver is necessary, the ATKHB commander will assign sectors to the companies. Figure 3-12 shows an ATKHB fire distribution plan.

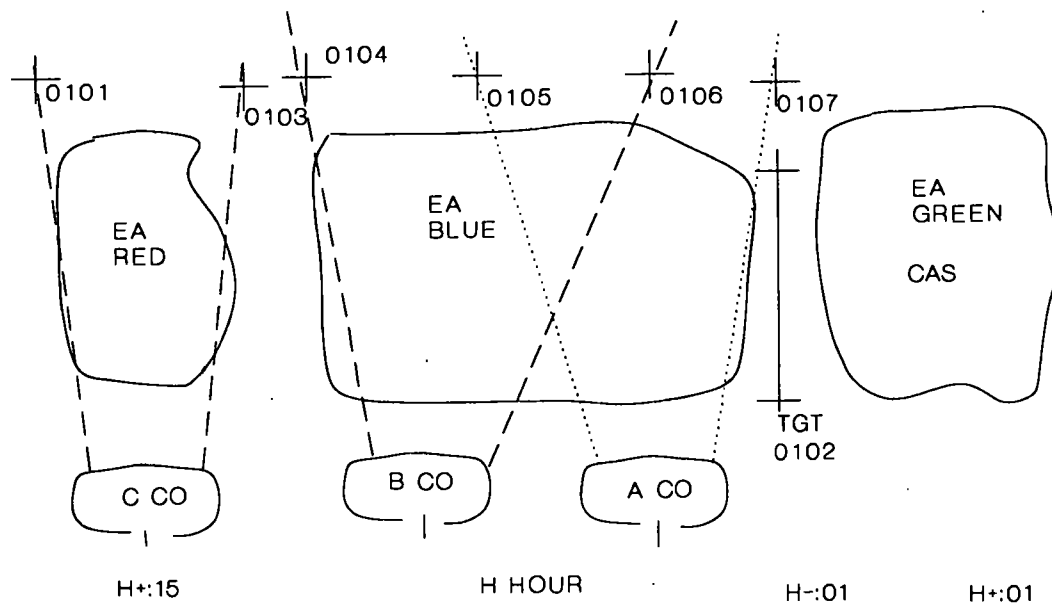


Figure 3-12. ATKHB fire distribution

(2) The ATKHC commander uses target reference points to assign platoon sectors of fire and designate specific targets. Target reference points are easily recognizable natural or man-made ground features and are identified throughout the engagement area. They allow the commander to orient platoon battle positions to specific areas, ensure overlapping coverage, and shift orientation quickly when necessary. A TRP may also be used to designate the center of an area where the ATKHC commander plans to distribute or converge the fires of all his weapons in a surprise engagement. Company commanders or platoon leaders usually designate TRPs for companies, platoons, sections, or individual aircraft. When the ATKHC is task-organized into sections or teams, the ATKHC commander assigns sectors in the same manner as he does for platoons. Figure 3-13 shows an ATKHC fire distribution plan.

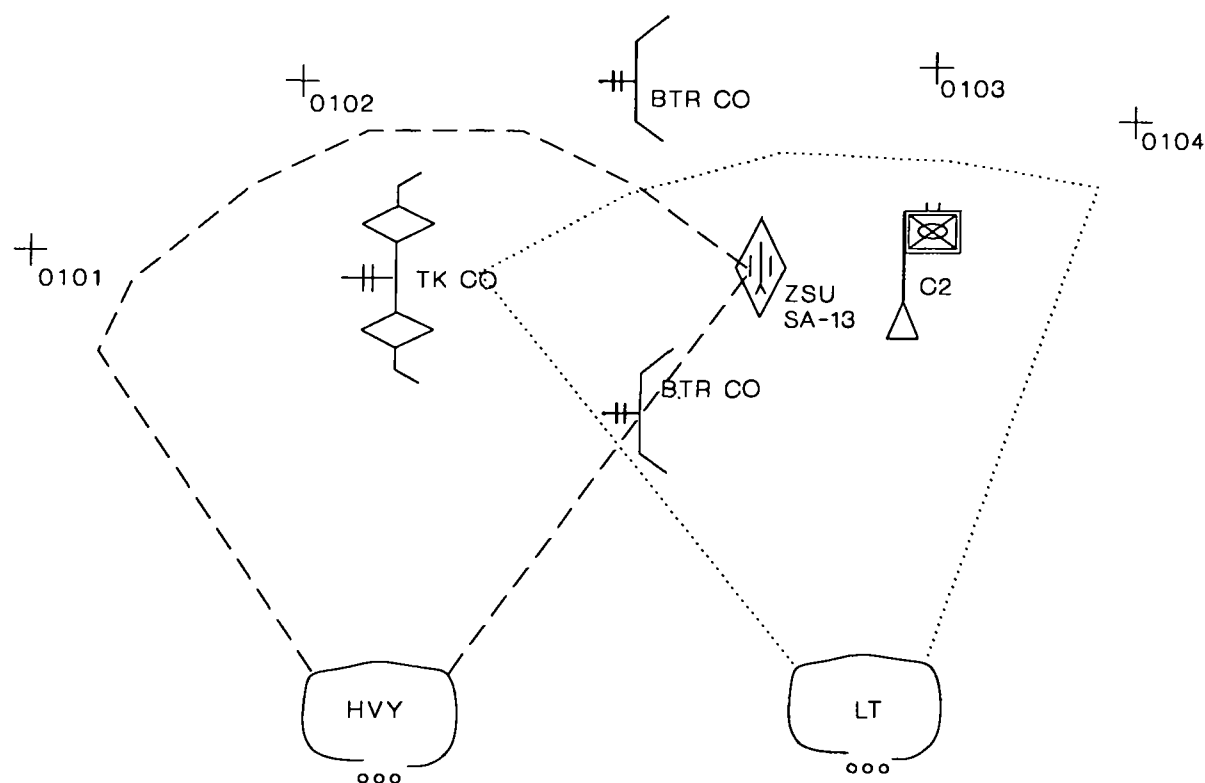


Figure 3-13. ATKHC fire distribution

(3) An ATKHC commander may also ensure fire distribution in an engagement area through the use of kill zones. Kill zones are designated throughout an engagement area and are preloaded into the AH-64 fire control computer. Specific kill zones are assigned to sections/teams. To orient the company to a changing situation, the kill zones assigned to sections/teams may be changed rapidly during an engagement. Figure 3-14 shows an ATKHC fire distribution plan using kill zones.

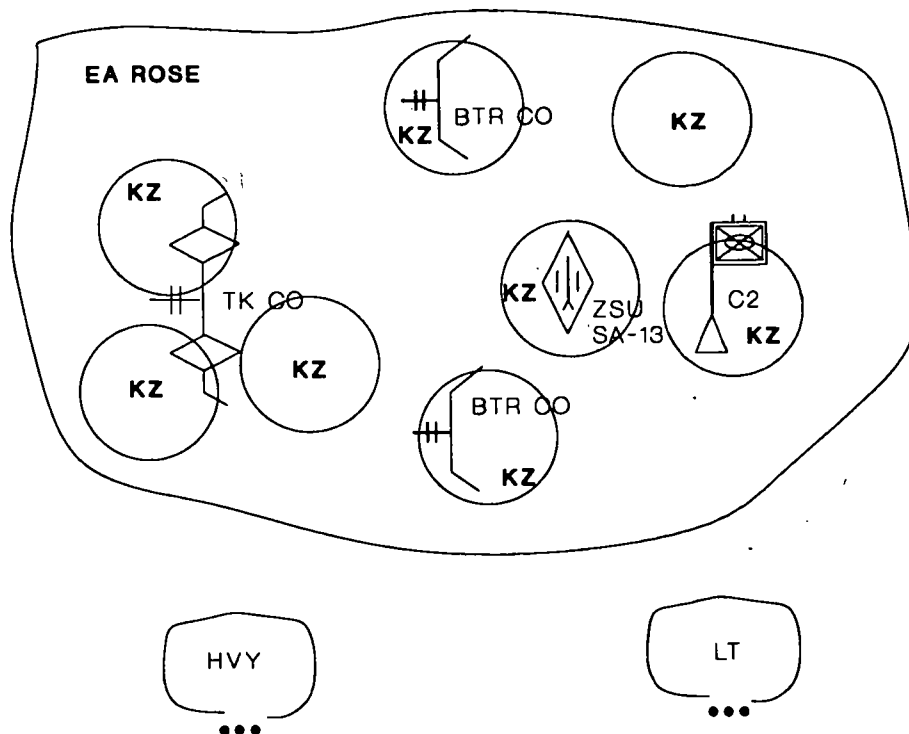


Figure 3-14. ATKHC fire distribution plan using prepointed kill zones

(4) Platoon, section, or team sectors of fire are further broken down to ensure complete coverage by the attack aircraft and designating aeroscout helicopters. Distribution of fires includes both the depth and lateral spread of the targets within the assigned sector. Platoon fire distribution of individual aircraft should be kept simple. Normally, this means that the sector is divided by breadth, and each aircraft fires in a specified direction such as toward a TRP or a given direction. The aircraft then works toward the center or in a direction such as left, right, north, or south. Depending upon wind conditions and the orientation of the target array, the distribution of fires may include depth as well as breadth. Fires directed at in-depth targets may be conducted so that the deeper targets are engaged first. This precludes the deeper targets from being obscured by smoke when the closer targets are hit. When the target array is in-depth, specific aircraft in a company or platoon may be directed to fire at the deeper targets while the rest of the company fires at the closer targets. Ideally, guidelines for fire distribution are established for efficient target engagement and fire distribution. Sample SOP guidelines for fire distribution are given below.

(a) Attack aircraft on the left fire at targets on the left of the engagement area. Attack aircraft on the extreme left fire at the extreme left target and shift toward the center.

(b) Attack aircraft on the right fire at targets on the right of the engagement area. Attack aircraft on the extreme right fire at the extreme right target and shift toward the center.

(c) If designator-equipped, aeroscout aircraft designate deep targets within the sector. When aeroscout aircraft designate targets for an indirect firing attack aircraft, they will distribute fires as shown in (a) and (b) above.

b. Attack Priorities. Attack priorities are engagement priority and target priority. Engagement and target priorities are used along with the company fire distribution plan to control the fires of the company.

(1) Engagement. Engagement priority is predominate when considering the two types of attack priorities. Engagement priority concerns the actions of the individual aircrew during the firing engagement. It encompasses immediate actions required for self-preservation and mission accomplishment. A general rule is for the aircrew to engage the nearest target that first poses a threat. Table 3-1 shows attack helicopter engagement priorities.

Table 3-1. Engagement priorities for an ATKHC
Attack in Sequence
1. Immediate threat to self.
2. Immediate threat to platoon or company.
3. Immediate threat to other friendly forces.
4. Preestablished target priorities.

(2) Target. Target priorities are mission-dependent and refer to the types of targets that should receive first priority for destruction. Priority lists are designated in the OPORD or in the unit SOP. The target priority may be the same for an entire battalion, company, or may vary by element in relation to the commander's scheme of maneuver. Examples of target priorities for an ATKHC are listed in Table 3-2.

Table 3-2. Example target priorities for an ATKHC	
Heavy Platoon	Light Platoon
Command vehicles	Air defense artillery
Engineer vehicles	Command vehicles
Tanks	Tanks
Air defense artillery	Engineer vehicles
Mechanized troop carriers	Mechanized troop carriers

Section II

BATTLEFIELD ENVIRONMENT

3-6. ENVIRONMENTAL FACTORS

On the battlefield, each belligerent will attempt to use the environment to his advantage. The environment includes what we can see (terrain, visible light, weather, and obscurants) and what we cannot see (electromagnetic measures, chemical and biological pollution, and biological stress). As part of their planning process, commanders must consider these environmental factors and attempt to use either the environment in their favor or negate its effects as much as possible.

3-7. WEATHER AND VISIBILITY

Weather and visibility create advantages and disadvantages for opposing forces. To fight effectively, the ATKHB commander must know how he is limited by weather and visibility and how he can best exploit the advantages of each. At times, the ATKHB may not be able to execute a mission because of the weather. Therefore, the ATKHB commander must advise the force commander of the restrictions that bad weather and visibility place on the ATKHB.

a. Weather. Weather affects soldiers, equipment, operations, and terrain. Cloud cover, wind, rain, snow, fog, dust, light conditions, and temperature extremes combine in various ways to affect human efficiency and limit the use of weapons and equipment. ATKHB assets are greatly influenced by the effects of weather conditions, but so are enemy assets. Rain can degrade the FLIR systems used on AH-64s for piloting the aircraft and targeting. However, rain also inhibits the cross-country maneuverability of Threat mechanized forces, causing their movement to slow or channelize on roads. Wind makes gunnery for attack helicopters more difficult, but it also makes Threat obscurants less effective. Each system used on the battlefield has

its strong and weak points in relation to the environment. Commanders must know the strengths of each system and use them to attack the weaknesses of enemy systems.

b. Visibility. Limited visibility affects operations and favors the attacker by masking his maneuver. However, darkness, fog, and smoke reduce the useful ranges of most weapons, including enemy air defense weapons. During periods of limited visibility, attack helicopters must maneuver closer to the enemy to kill it. The winner of an engagement will usually be decided by the soldier or aircrew that gains surprise, acquires the target, and accurately fires the fastest. ATKHC commanders must maneuver their forces to a positional advantage using the terrain and concealment afforded by the limited-visibility environment. Once in position, crew members will have to acquire the target, fire rapidly, and then move. Cockpit coordination and gunnery will have to mesh and become second nature to the aircrews. At close range, any delay in effectively engaging the enemy and repositioning gives the enemy time to react and return fire.

3-8. TERRAIN

"Geography and ground can affect military operations in three ways: as an obstacle to the approach, as an impediment to visibility, and as cover from fire."

Clausewitz, On War

a. Analysis. Terrain analysis is a critical skill; all members of the ATKHB must develop an understanding of the limitations and opportunities that terrain affords. ATKHB commanders and their staffs perform terrain analysis in light of their units' missions. They evaluate the terrain's potential for cover and concealment, its impact on their maneuver and the enemy's movements, and its use for observation and direct fire effect. The key elements of terrain analysis are summarized in the traditional mnemonic OCOKA: observation and fields of fire, cover and concealment, obstacles and movement, key terrain, and avenues of approach. Terrain analysis is covered further in FM 21-33 and Appendix A.

b. Reinforcement. The proper use of natural obstacles and the reinforcement of terrain must be an integral part of the ATKHB commander's plan. Artillery fires, direct fire engagement areas, and obstacles must all be meshed in the tactical plan. Engineers use obstacles to disrupt, fix, turn, or block the enemy. Disruptive obstacles cause enemy formations to separate or bunch up, which disrupts its maneuver and attack. Fixing obstacles slow enemy progress and allow friendly artillery and direct fires the opportunity to mass. Turning obstacles drive the enemy toward friendly engagement areas and massed fires or force it to expose its flanks, allowing friendly gunners to achieve a positional advantage. Blocking obstacles deny the enemy access to a given area or prevent its advance in a given direction. Although the ATKHB will seldom have engineer support to establish obstacles, the ATKHB commander must understand the force commander's obstacle plan and use it to the battalion's advantage.

c. Intelligence. To the fullest extent possible, the commander must acquaint himself with the terrain before combat. Because maps are sometimes inaccurate or incomplete, commanders should conduct a detailed, personal reconnaissance. Company commanders should ensure that their aircrews are familiar with the terrain and scheme of maneuver. If possible, company personnel should visit battle and firing positions, perform a map reconnaissance, and conduct sand table exercises before executing a mission. These actions will help them to understand the scheme of maneuver, commander's intent, and terrain and quicken their reactions during the chaos of battle.

3-9. SPECIAL ENVIRONMENTS

The ATKHB operates best over open, rolling terrain, which is also favored by mechanized forces. It is least effective against enemy forces that are stationary, well-camouflaged, and in prepared positions. The ATKHB will be called upon to execute its mission in a variety of environments. The following paragraphs cover specialized environments in which the ATKHB may be expected to operate. FM 1-202 covers the effects of the environment on flight.

a. Urbanized Terrain. Attack helicopters are not well-suited to fight over urbanized terrain. In urban areas, fields of fire are restricted and buildings provide cover for enemy light forces to engage attack helicopters with near impunity. This type of terrain negates the effectiveness of the long-range, precision munitions of the attack helicopter. Rockets and cannons can be used against light structures; however, they do not have sufficient explosive power to be used against well-constructed buildings of reinforced brick and concrete. In an urban environment, mortars and artillery are much more effective than attack helicopters. The ATKHB should operate on the outskirts of an urban area and attack Threat mechanized forces that are attempting to bypass or envelop friendly forces in the built-up area.

b. Mountains. Mountainous areas provide unique opportunities for attack helicopters. While high altitude limits the load-carrying capability of the attack helicopter, the terrain is compartmentalized, allowing for rapid movement to the flanks and rear of an isolated enemy force. Enemy mechanized forces will be slowed and channelized as they move up steep grades and down narrow valleys or are restricted to roads and trails. Mountains provide excellent terrain-masking and allow easy avoidance of radar and visual acquisition. However, high ridges also provide effective firing positions for AD gun and hand-held missiles. The nature of the terrain and the distances that must be traversed to get into position to attack may require that the ATKHB engage the Threat without the support of the other combined arms.

c. Jungles. Dense jungles and wooded areas severely limit the capability of the ATKHB to engage point targets. Heavily wooded areas degrade fields of fire and target identification. Although the capability of the ATKHB to engage point targets is degraded, it can still provide supporting fires for other members of the combined arms team. Attack helicopters can carry large loads of area weapons. When directed by aeroscouts or ground forces, they can place heavy fires on the enemy. These fires can suppress

the enemy, which blocks its withdrawal or destroys its massed light forces. When fighting in this environment, the ATKHB may sometimes assume a fire support role. However, the ATKHB should not be used piecemeal as pairs of aircraft responding to calls for fire. ATKHB fires should be maximized against enemy targets that oppose the friendly main effort. Some things to remember when operating in a jungle environment are that--

- Attacks should not overfly the target.
- Humid tropical air decreases aircraft lift capabilities.
- Thunderstorms can cause rapid and violent changes in the weather.
- Attacks should be made simultaneously from more than one direction to confuse the enemy.
- Attacks should be made along the length of the enemy force, not perpendicular to it.
- The location of friendly forces needs to be marked and easily identified from the air.
- Constant communications and liaison are needed between the attacking ATKHB and the element of the supported ground force in contact.
- Attacks should not be made over the heads of friendly ground forces. (Expend shells falling from the attack aircraft may cause confusion among friendly troops, which is true for all types of terrain.)

d. Deserts. The ATKHB can effectively operate in the desert or in open terrain. However, it is vulnerable to enemy long-range observation, acquisition, and harsh environmental conditions. Heat limits weapon and fuel loads that each attack aircraft can carry, and sand and dust will damage the aircraft. Attack aircraft flying low and slow may produce large dust clouds. Clouds of dust are easily detected and obscure aircraft acquisition systems. These severe conditions require proper maintenance, engagement techniques, and positioning of Class III/V resources. Extra maintenance will help correct the problems of heat, sand, and dust. Both air and ground crews must be aware that engines have to be cleaned and filters changed more often during desert operations. Firing while flying above ETL diminishes the dust signature and aids in survivability. The loss of load capabilities is overcome by placing FARPs closer to the engagement areas. When operating above ETL, attack aircraft can operate at higher gross weights than when hovering fire is used.

3-10. NUCLEAR AND CHEMICAL WEAPONS

a. The Threat can be expected to use NBC weapons when it is advantageous to do so. Nuclear and chemical weapons could have a devastating effect if friendly forces are unprepared for their use.

b. The ATKHB commander must take the exposure guidance of his higher headquarters, the enemy's intent and capability, and the mission and condition of the unit into account when setting the battalion MOPP level. If the enemy can use or has used chemical weapons anywhere on the battlefield, commanders must immediately take precautionary measures to protect their battalions. This will normally mean that the ATKHB will conduct operations in MOPP2 before chemical weapons are used and go to MOPP4 when their use is imminent or after they are used. The ATKHB will survive by anticipating nuclear or chemical attacks. To avoid becoming lucrative targets, commanders must--

- Avoid detection.
- Retain mobility.
- Disperse forces and resources to limit damage.
- Plan for rapid reorganization and be prepared to continue operations.
- Seek terrain-shielding by carefully selecting assembly areas and preparing shelters/fighting positions.
- Be aware of flying debris in a nuclear environment.
- Be alert to the possibility of a nuclear or chemical attack and adjust the MOPP level and unit dispersion according to the Threat.
- Instill discipline and physical conditioning to prepare troops for the confusion and physical demands of a nuclear/chemical environment.

3-11. ELECTRONIC WARFARE

The Threat will attempt to disrupt and confuse our operations through the denial of the electromagnetic spectrum. These operations not only include disruption of communications and identification of friendly forces but also the disruption, deception, and damage of weapon systems. Countermeasures must be used to cope with the Threat's EW capabilities. Further information on electronic warfare is contained in FM 34-40. To conceal emitters or deceive the enemy as to their identities and locations, the ATKHB commander should--

- Change radio frequencies often.
- Operate radios on the lowest power possible.
- Restrict the use of the electromagnetic spectrum.
- Use wire or cable communications whenever possible.

- Use directional antennas and mask emitters with terrain.
- Train subordinates to act independently in support of the mission and the commander's intent when communications fail.

3-12. SMOKE AND OBSCURANTS

a. Smoke and obscurants are integral to Threat doctrine, tactics, equipment, and training. The Threat will use smoke to increase its effectiveness and reduce its vulnerability. Specifically, smoke can--

- Deny information.
- Mask the use of chemical weapons.
- Disrupt movement, operations, and command and control.
- Restrict NOE and contour approaches to engagement areas.
- Reduce the effectiveness of sensors, range finders, and target designators.

b. The ATKHB can also use smoke to enhance its survivability. Through the use of artillery-fired smoke or 2.75-inch FFAR white phosphorus rounds, the ATKHB can achieve the same results as the Threat. Additional benefits of the use of smoke by ATKHBs are--

- To suppress visually sighted enemy ADA systems and small arms.
- To sector portions of the engagement areas, isolating part of the enemy force.
- To screen the displacement of the ATKHCs while they move to new firing or battle positions or break contact.

3-13. BATTLEFIELD STRESS

a. As they plan and conduct operations, commanders must remember the stressful effects of combat and minimize adverse consequences. While ground forces will carry the brunt of the fighting, the enemy's main effort will not always affect the same units. Because the ATKHB can maneuver quickly and mass combat power at the critical time and place, it can expect to engage in direct combat more often than other maneuver units. Therefore, minimizing the adverse effects of battlefield stress is an important factor in ATKHB combat effectiveness.

b. The adverse effects of battlefield stress may occur as--

- Physical and mental fatigue from sleep loss.
- Continual physical/mental effort under high work load and time pressures.

- Physiological stress from extreme temperatures; noise; vibration; blasts, flashes and radiation; battlefield air pollution; all degrees of effects from chemical weapons and their antidotes; and other-than-fatigue effects from the factors listed above.
- A generally incapacitating, long-term (days, months, or sometimes years) psychological stress casualty syndrome (combat fatigue).
- Transient, severe degradation or breakdowns in mental capabilities (and physical capabilities under some extreme situations) during the extreme fear of actual combat and anticipation of actual combat.

A combination of all these effects exists in some degree (usually a substantial degree) in every individual in every combat situation. This combination of stress effects will initially reduce the combat effectiveness of individuals and units below that demonstrated during peacetime training. As their combat experience increases, most individuals will learn to cope with the adverse effects of battlefield stress on their combat performance. However, even a combat-experienced unit's performance can be expected to remain below that demonstrated during peacetime training.

c. Leaders at all levels must be able to recognize the signs of fatigue and battlefield stress. Fatigue and battlefield stress will cause noncombat-related accidents that will diminish the combat power of the ATKHB just as quickly as enemy actions. Fatigue can be controlled through rest; aircrews that fight all day cannot expect to fight all night. Prompt treatment of stress casualties in forward areas can return most soldiers to duty rapidly. Both ATKHB and ATKHC commanders must make a realistic evaluation of the condition of their soldiers and then make recommendations to the force commander about their capability to continue the fight.

Section III

COMBINED ARMS OPERATIONS

3-14. FRAMEWORK OF THE BATTLEFIELD

AirLand Battle doctrine specifies that deep, close, and rear operations occur simultaneously. An ATKHB can conduct all three during offensive and defensive operations. An ATKHB conducting deep operations allows corps and division commanders to influence close operations before the enemy closes with friendly forces. During the conduct of close operations, an ATKHB allows corps and division commanders to weigh their main effort and brigade commanders to attack the enemy in depth. An ATKHB also gives corps and division commanders the ability to mass combat power rapidly against both enemy ground penetrations and large airborne or heliborne assaults into the corps or division rear area.

3-15. ATTACK HELICOPTERS IN COMBAT OPERATIONS

Attack helicopters are offensive weapons. Regardless of the overall posture of the larger force, the ATKHB will conduct offensive operations. There are no clear-cut solutions for attack helicopter operations in the offense or defense. The force commander's assessment of the factors of METT-T influence the missions that are assigned to the ATKHB. With the ATKHB commander's assistance, the force commander determines where the ATKHB will be used. From the force commander's mission and intent, the ATKHB commander determines how the battalion will be employed. Used alone or in combination, some of the force commander's options for employing the ATKHB are--

- Dominate avenues of approach.
- Reinforce ground forces by fire.
- Mass to defeat enemy penetrations.
- Attack massed armor or light forces.
- Attack in depth to extend the influence of the force.
- Attack to protect the flanks of a moving or halted main body.
- Overwatch the movement and passage of lines by ground forces.

3-16. AIR COMBAT

The ATKHB must plan for and expect to encounter and engage enemy air assets anywhere on the battlefield. Engagements with other helicopters may occur by chance or as part of a well-planned, forward air defense network. In either instance, the ATKHB must counter the enemy's aviation assets to accomplish its assigned mission. More information on air combat is covered in Appendix B and in FM 1-107.

3-17. OFFENSIVE OPERATIONS

a. Destroying the enemy's fighting force is the only sure way of winning any future conflict. The operational concepts of offensive operations are concentration, surprise, speed, flexibility, and audacity. The ATKHB gives the maneuver commander, who conducts offensive operations, a viable force that can rapidly concentrate firepower at the decisive time and place.

b. Corps and divisions use five complementary elements in fighting offensive battles. These elements are: main and supporting attacks; a reserve in support of an attack; reconnaissance and security operations forward, to the flanks, and to the rear of attacks; deep operations; and rear operations. ATKHBs can operate as part of each of these elements by conducting hasty and deliberate attacks and special-purpose operations. As part of the five elements, they can act as part of the main attack force by conducting deliberate attacks. The ATKHB can also conduct supporting attacks by cutting off enemy reinforcements and acting as part of the reserves, ready to

weigh the main effort and to exploit success. Figure 3-15 shows examples of ATKHBs employed during offensive operations.

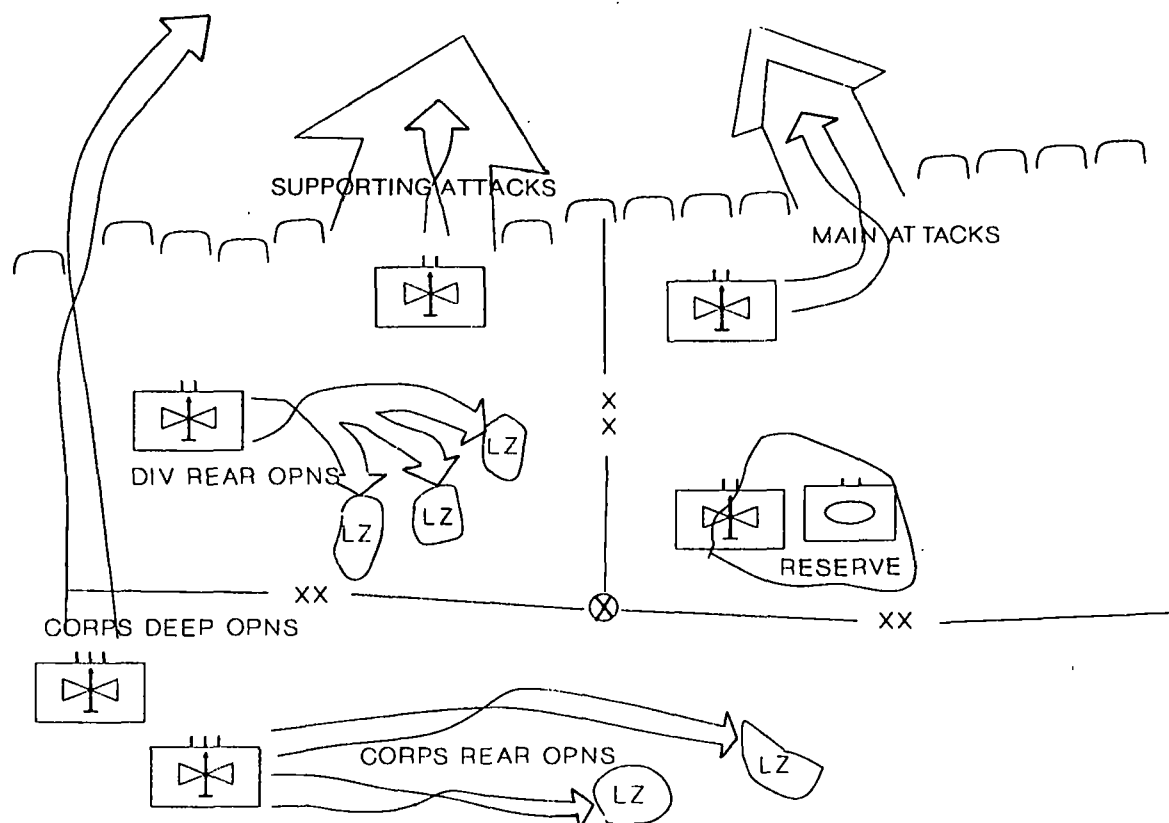


Figure 3-15. ATKHB as part of offensive operations

3-18. PHASES OF OFFENSIVE ACTION

a. Preparation. A movement to contact is used to gain or reestablish contact with the enemy. It may be used when contact with the enemy has been temporarily lost, or it may be used to initiate an attack. A movement to contact helps develop the situation and maintain the commander's freedom of action. During a movement to contact, the ATKHB operates with ground forces and is critical to the success of the advance forces and the main body. A movement to contact often results in a meeting engagement; that is, forces engage each other by chance rather than by design. As part of the covering force or advance guard, the ATKHB can destroy forward enemy elements identified by air cavalry or ground forces. The mobility and firepower of the ATKHB will permit the main body commander to overwhelm the enemy and maintain

the initiative. This means that the commander will not have to pause and marshal the necessary ground combat power to attack.

(1) As part of the advance guard, the ATKHB is used to attack enemy forces that are attempting to disrupt friendly operations. The ATKHB will operate from successive forward assembly areas located along the axis of advance. As lucrative targets of opportunity are identified by other members of the advance guard, the ATKHB maneuvers to conduct hasty attacks to destroy or disrupt them. The battalion plans these hasty attacks using the IPB process.

(2) When the ATKHB is employed as part of the main body, it will exploit enemy weaknesses and attack counterattacking forces. It will operate from successive forward assembly areas and maneuver to reinforce attacking ground forces or attack advancing or withdrawing enemy forces.

(3) When planning to operate as part of a movement to contact, the ATKHB commander looks at possible engagement areas along the entire axis of advance and their associated holding areas, attack routes, and battle positions. Figure 3-16 shows an example of an ATKHB as part of the advance guard. At the beginning of the operation, the ATKHB commander identifies EAs, HAS, and BPs along the friendly force's axis of advance and occupies forward assembly area 1. As the advance guard crosses PL 1, the ATKHB commander conducts a more detailed analysis of EAs located between PL 1 and PL 2 or Phase 1 of the operation. When the advance guard crosses PL 2, the ATKHB is repositioned to forward assembly area 2 and the analysis sequence for Phase 2 is repeated. This sequence of moving and planning repeats itself throughout the operation.

b. Attack. The two types of attacks are the hasty attack and the deliberate attack. Each is discussed in the paragraphs that follow.

(1) Hasty. A hasty attack is an operation for which a unit has not made extensive preparations. It is conducted with the resources immediately available to maintain momentum or take advantage of the enemy situation. Hasty attacks made by ATKHBs are only slightly different from those made by other maneuver units. With a ground maneuver unit, the main consideration is retaining the momentum of its own attack. For attack helicopters, a hasty attack is made on an enemy force to retain the momentum of the entire force. Hasty attacks conducted by the ATKHB are made with the foreknowledge of where its engagement areas and battle positions are located. However, the exact time, engagement area, and the threat to be encountered during the attack are not known until shortly before the mission. Figure 3-17 shows an ATKHB making a hasty attack.

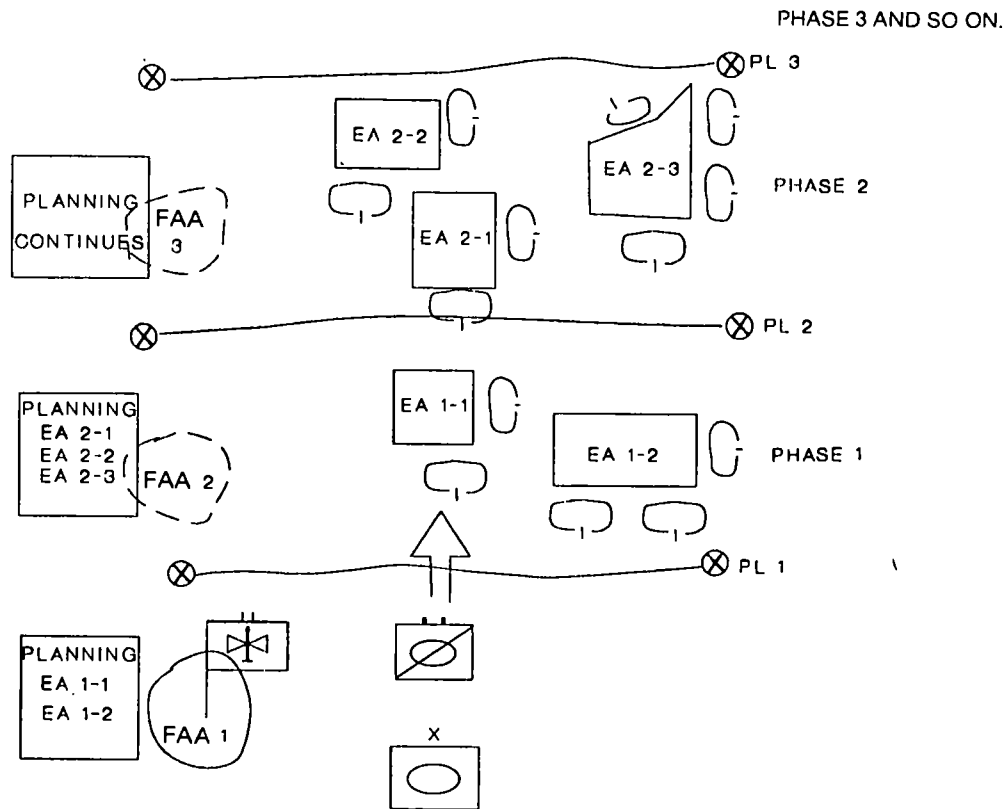


Figure 3-16. ATKHB as part of the advance guard

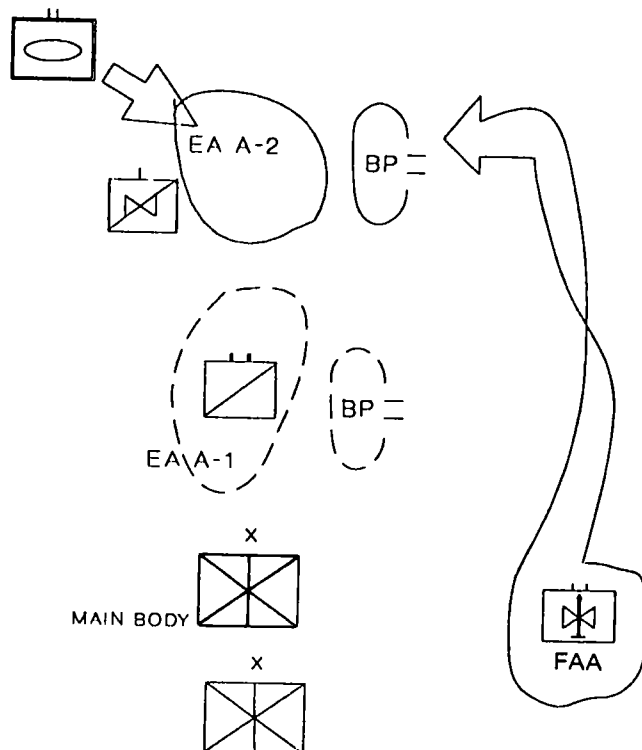


Figure 3-17. ATKHB making a hasty attack

(2) Deliberate. A deliberate attack is conducted against an enemy that is well-organized and cannot be turned or bypassed. It is planned and carefully coordinated with all concerned elements. The deliberate attack is based on a thorough reconnaissance, an evaluation of all available intelligence and relative combat strength, an analysis of various courses of action, and other factors affecting the situation. To conduct a successful deliberate attack, the ATKHB is integrated with the overall force scheme of maneuver. The ATKHB provides a mobile and flexible combat capability and can execute contingency plans as well as attacks that support the main effort. During a deliberate attack, the ATKHB can conduct attacks on enemy command and control facilities and on counterattacking or withdrawing enemy forces. Figure 3-18 shows an ATKHB as part of a division main attack. The ATKHB has two on-order missions that it can execute. These missions are an attack against counterattacking armor forces in EA 2 or EA 3 or an attack to exploit withdrawing forces in EA 1.

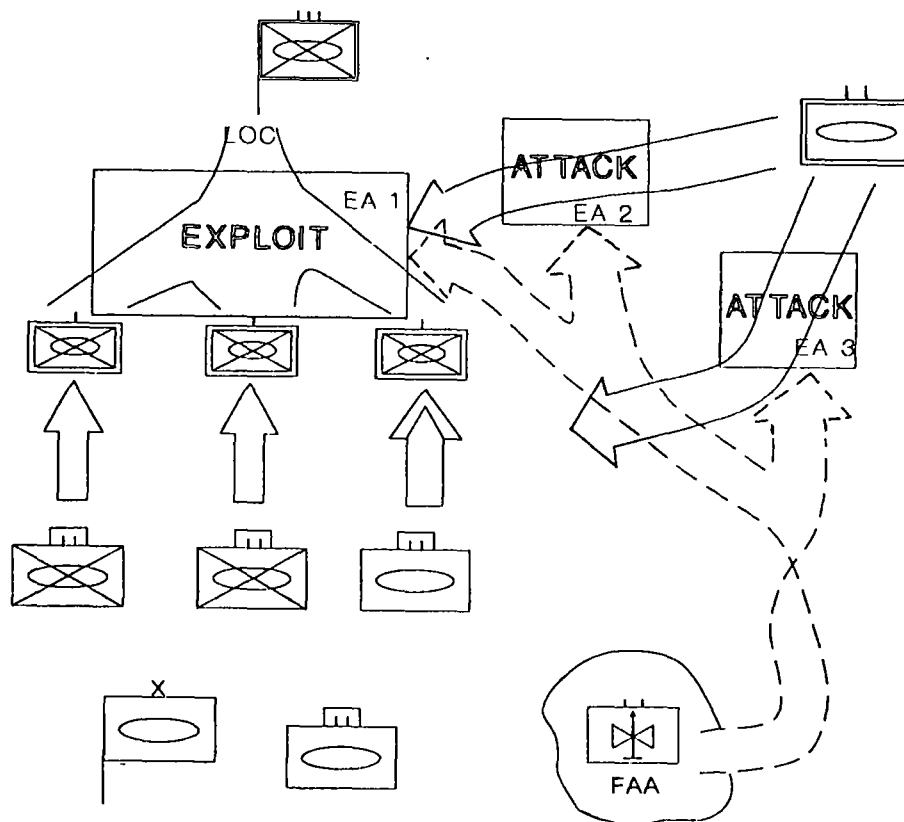


Figure 3-18. ATKHB as part of a deliberate attack

c. Exploitation. An exploitation usually follows a successful attack and is made to take advantage of weakened or collapsed enemy defenses. It prevents the enemy from reorganizing a defensive system or conducting an orderly withdrawal. An exploitation is also conducted to secure deep objectives. During an exploitation, an ATKHB is employed as part of a larger force. The ATKHB strikes the enemy's flanks and rear areas disrupting its withdrawal and attempts to reorganize. The ATKHB operates as in a movement to contact by following the ground forces and is prepared to conduct hasty attacks on counterattacking and withdrawing enemy forces. The ATKHB can also conduct deep attacks to further disrupt the enemy.

d. Pursuit. A pursuit is an offensive operation taken after a successful attack or developed during an exploitation. The pursuit takes advantage of enemy weaknesses and its inability to establish an organized defense. As the enemy attempts to disengage, friendly forces maintain relentless pressure in an attempt to destroy enemy forces completely. A pursuit requires unrelenting pressure, speed, mobility, and firepower to complete the enemy's destruction. The ATKHB is an essential element in the pursuit. As ground forces attempt to maintain contact and flank the enemy, the ATKHB and air assault forces can maneuver deep to cut off the enemy as it attempts to withdraw. The ATKHB and air assault forces can also block entry to relieving enemy forces and attack retreating enemy forces, which further deteriorates their situation. Repeated attacks by the ATKHB will quicken the disintegration of enemy forces and destroy their will to fight. Figure 3-19 shows an ATKHB as part of a pursuit. Command and control during a pursuit is critical. Commanders must coordinate the pursuit by ground forces and the ATKHB to ensure success during a rapidly changing combat environment. Communications may become difficult or be broken. When this occurs, commanders must act quickly to reestablish communications and ensure coordination between air and ground maneuver.

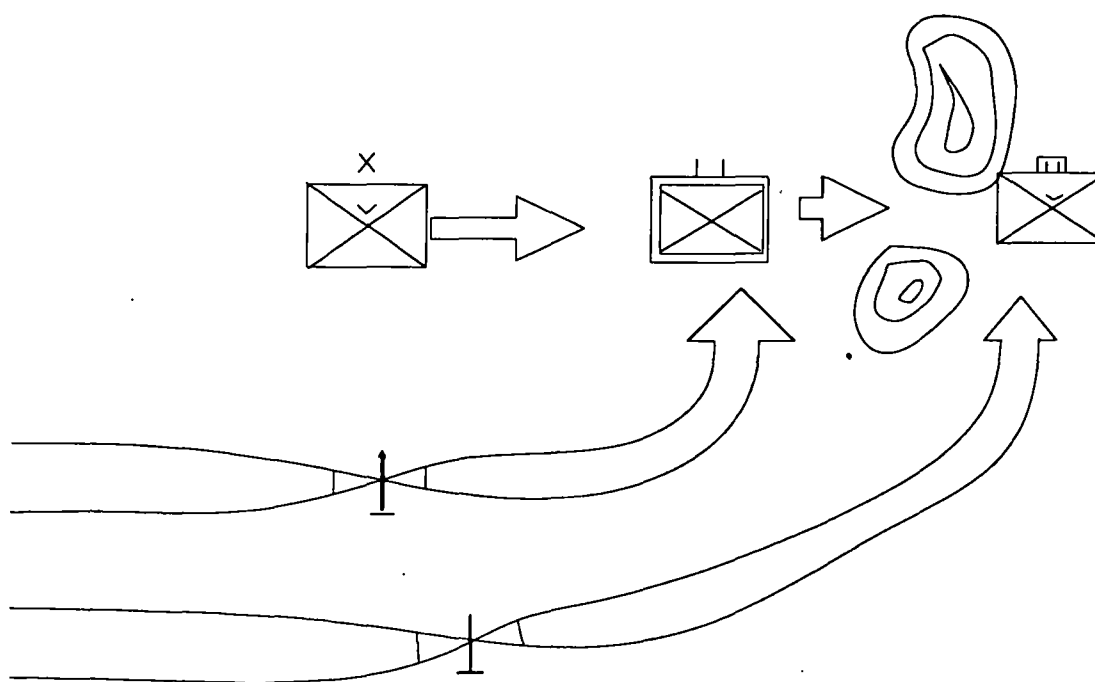


Figure 3-19. ATKHB as part of a pursuit

e. Special-Purpose Operations. In addition to the three major types of offensive operations, the ATKHB must be prepared to conduct several special-purpose operations. These include reconnaissance in force, raids, and aerial-security operations. Raids are covered in paragraph 3-20.

(1) Reconnaissance in force. A reconnaissance in force is a limited-objective operation that is conducted by a battalion-sized element, as a minimum. Its purpose is to obtain information and locate and test enemy dispositions, strengths, and reactions. When conducting a reconnaissance in force, an ATKHB is task-organized with ground units. The ATKHB will organize this force into two parts--the reconnaissance element and the attack element. Figure 3-20 shows an ATKHB conducting a reconnaissance in force.

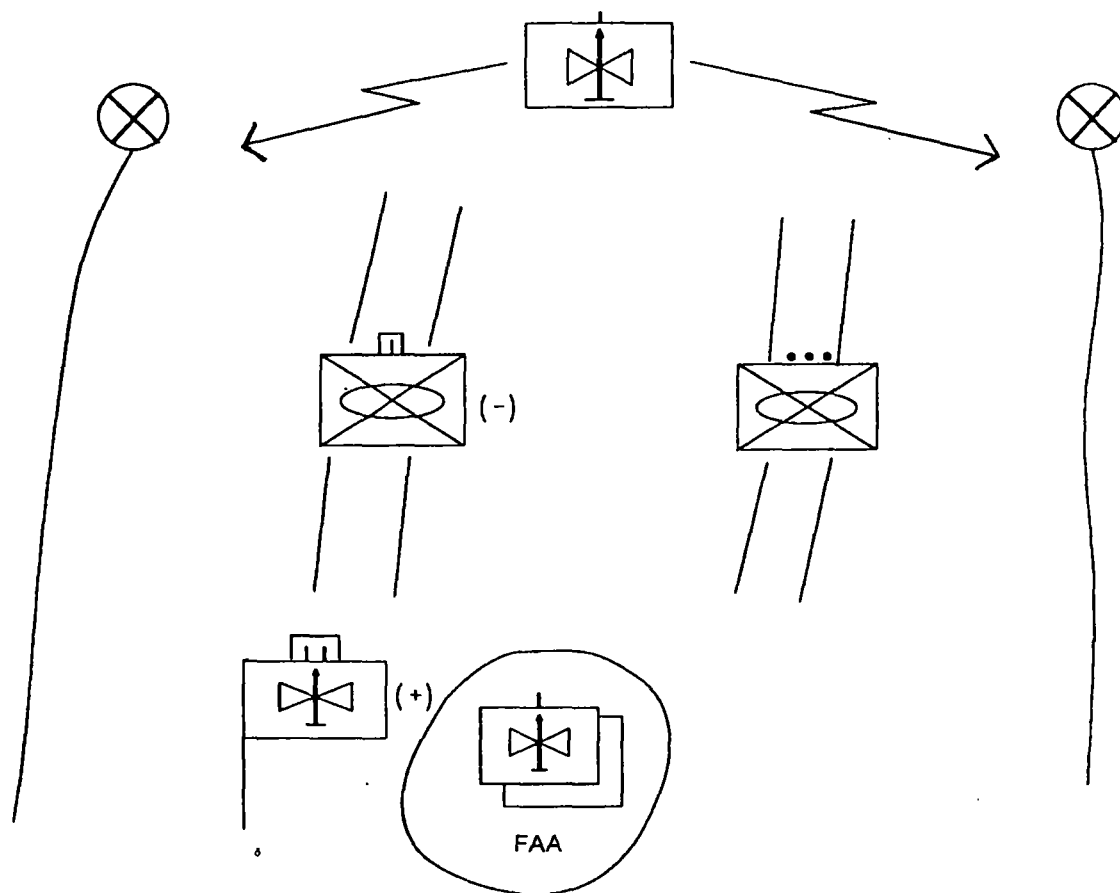


Figure 3-20. ATKHB conducting a reconnaissance in force

(a) Normally, the reconnaissance element is made up of the ground elements and rotating ATKHCs. The reconnaissance element conducts the operation as a zone reconnaissance. The ground maneuver elements reconnoiter roads and avenues of approach that are easily traversed by ground forces. An ATKHC screens in front and between the ground forces and reconnoiter areas that are unsuitable for ground reconnaissance. Normally, the ATKHB will rotate companies from the forward assembly area to the screen line and then

back to the FARP, as in a continuous operation. When elements of the reconnaissance make contact, they will report and develop the situation. Zone and route reconnaissances are covered in FM 1-114.

(b) The attack element is made up of the remainder of the ATKHB maneuver companies. These companies remain in the forward assembly area ready to exploit any enemy weaknesses discovered in the area of operations or assist the reconnaissance element in breaking contact.

(c) During a reconnaissance in force, an ATKHB may also work as an element of a larger force. As such, the ATKHB acts as a reserve, ready to conduct offensive actions to support the force.

(2) Air assault security. The ATKHB must be prepared to provide security for an air assault operation. Security must be provided during all phases of the operation, to include picking up the assault force, moving to the LZ, and executing the landing. Moreover, the ATKHB should be prepared to dominate avenues of approach into the objective and, when attacking enemy light forces, provide suppressive fires for the assault force on the objective. The ATKHB must be responsive to the needs of the AATFC.

NOTE: Air assault security may be provided by an ATKHB for large, brigade-sized air assaults; however, it is normally provided by an ATKHC that is placed under OPCON of the AATF. This is one of the few times that an ATKHC will operate away from the ATKHB.

(a) Air route, area, and LZ/PZ reconnaissance. A route reconnaissance is normally conducted by air cavalry or air reconnaissance elements before the air assault. However, if these reconnaissance elements are not available, the ATKHB must conduct a route and LZ/PZ reconnaissance before the mission. Several routes and LZs must be reconnoitered to conceal the actual routes and LZs. The reconnaissance should be conducted well in advance of the mission and under the conditions that the mission will be flown. Routes that will be used at night must be reconnoitered both during the day and at night. Just before the mission is executed, elements of the ATKHB will screen forward of the AATF to reconfirm reconnaissance information and ensure security of the route. Upon reaching the LZ, the screening element will establish a screen around the LZ. Route and LZ/PZ reconnaissance is covered in detail in FMs 1-114, 1-116, and 1-117.

(b) Security in the pickup zone. The ATKHB may provide security while assault aircraft are in the PZ, especially if the PZ is across the FLOT. Normally, security is provided by the other ground forces. ATKHCs take up overwatching positions where they can observe air and ground avenues of approach into the PZ.

(c) Security en route. The amount of en route security provided by the ATKHB will depend on the size of the air assault force. One ATKHC can provide security for a small assault force. The ATKHC can position its aircraft to the rear and flanks of the force and provide suppressive fires against ground and air threats. If the assault force is large, two

ATKHCs can secure the move. In addition, air cavalry assets or an ATKHC can provide security forward of the assault force.

(d) Security in the landing zone. Methods used to secure the LZ are similar to those used to secure the PZ. Battle positions are planned overwatching the LZ and air and ground avenues of approach into the LZ. The reconnaissance element should already be covering these areas but may need to be relieved so it can return to the FARP for fuel.

(e) Suppressive fires in the attack. Once the air assault force is on the ground, the ATKHB must be prepared to provide suppressive fires on the objective (light enemy forces) or attack approaching enemy reinforcements. At this stage, the ATKHB reverts to its normal method of operations.

3-19. DEFENSIVE OPERATIONS

A successful defense requires reactive and offensive elements working together to regain the initiative. The objective of a defensive operation is to cause the enemy attack to fail; preserve the force, facilities, and installations; control key terrain; gain time; or concentrate forces elsewhere. Other objectives may be to retain captured terrain and degrade enemy forces so that offensive operations can be resumed. Successful defensive operations depend on--

- Synchronizing all available combat capabilities.
- Seizing the tactical initiative locally and then generally as the entire force shifts from defense to offense.
- Fighting the enemy throughout the depth of its formations to delay and disorganize it and create opportunities for offensive actions.

3-20. DEEP OPERATIONS

a. Deep operations are activities directed against enemy forces that are not currently engaged but that could influence division or corps close operations within the next 24 to 72 hours. The ATKHB will conduct deep operations at both the corps and division levels. Deep attacks by corps ATKHBs help the corps commander to shape the battlefield and set the terms for close operations. Deep attacks conducted by divisional ATKHBs help the division commander to shape the battlefield and are used to allow defending maneuver brigades to engage the enemy throughout its depth. Deep operations will occur during both offensive and defensive operations.

b. Deep operations are high-risk, high-payoff operations that must be executed with the utmost care. Planning must be detailed and as precise as possible to allow the ATKHB to accomplish its mission with the least amount of risk. Planning considerations for deep operations are covered in Appendix C. The types of missions that the ATKHB can be expected to execute during deep operations are discussed below.

(1) Raid. A raid is a special-purpose operation characterized by swift penetration of hostile territory to secure information, confuse the enemy, or destroy its installations. The ATKHB conducts raids on enemy command and control, assembly areas, air staging areas, and logistics. An ATKHB is not the best asset to send against these targets when field artillery can range the target or when BAI/AI is available.

(2) Ambush. An ambush during deep operations is similar to a raid except that it is a surprise attack by fire from concealed positions on a moving or temporarily halted enemy. The enemy force may be either ground or air. Corps ATKHBs conduct deep ambushes to destroy, attrit, or disrupt enemy follow-on forces that are out of range of divisional assets.

(3) Spoiling attack. A spoiling attack is a limited-objective attack made to disrupt or delay an enemy force before it launches an attack. A spoiling attack strikes the enemy while it is most vulnerable such as during its preparations for the attack in assembly areas or forward assembly areas or while it is on the move before crossing the LD. Corps ATKHBs conduct spoiling attacks against enemy forces in the same manner as the ambush except the mission is to disrupt enemy operations rather than to destroy the enemy force. Enemy exploitation forces moving through the rear area of a forward enemy division are susceptible to corps ATKHBs conducting spoiling attacks. Divisional ATKHBs may conduct spoiling attacks to strike enemy forces that are attempting to exploit breakthroughs or overwhelm security forces before they reach the FEBA.

(4) Sustained attack. A sustained attack is the riskiest of the deep attack operations. It is conducted when the corps intends to shift from the defense to the offense. A sustained deep attack is a corps mission that will include the subordinate divisions operating with substantial support from the corps. The two approaches to an ATKHB sustained attack are discussed below.

(a) The ATKHR conducts attacks to destroy enemy forces in front of an advance by friendly mechanized forces. The object of the attack is to increase the tempo of the operation through the destruction or attrition of enemy forces along the ground force's axis of advance. As the ATKHR maneuvers forward to attack, air assault task forces and CSS follow to secure the terrain and sustain the attack by the ATKHR. Figure 3-21 shows a sustained deep attack.

(b) On a smaller scale, ground forces lead and ATKHBs act as part of the advance guard or main body, as described in a movement to contact. Corps ATKHRs may reinforce the advancing divisions, exploit, dominate enemy LOCs, or protect flanks from enemy counterattacks.

of the speed and flexibility of the ATKHB, it can rapidly concentrate combat power throughout the covering force area. The ATKHB is employed in hasty attacks to accomplish the objectives of the covering force commander. Employed well forward, it operates out of forward assembly areas in the rear of the covering force area. At corps level, the ATKHB may be attached or placed under OPCON of armored cavalry regiments to increase their long-range antiarmor fires. At division level, the ATKHB is the primary long-range armor killer.

b. Once the fight has moved into the main battle area, the commander should use the ATKHB against the enemy's main effort. To take decisive offensive action, commanders can retain their ATKHBs as part of their reserve. An ATKHB should not be held in reserve to redeem failure. The commander commits the ATKHB at a decisive place to exploit success or ensure accomplishment of the mission. The use of an ATKHB in the defense often comes as part of a counterattack. The ATKHB counterattacks along with other maneuver forces to strike the enemy throughout its depth and help the force seize the initiative. Figure 3-22 shows an ATKHB that is being used to counter the enemy's main attack.

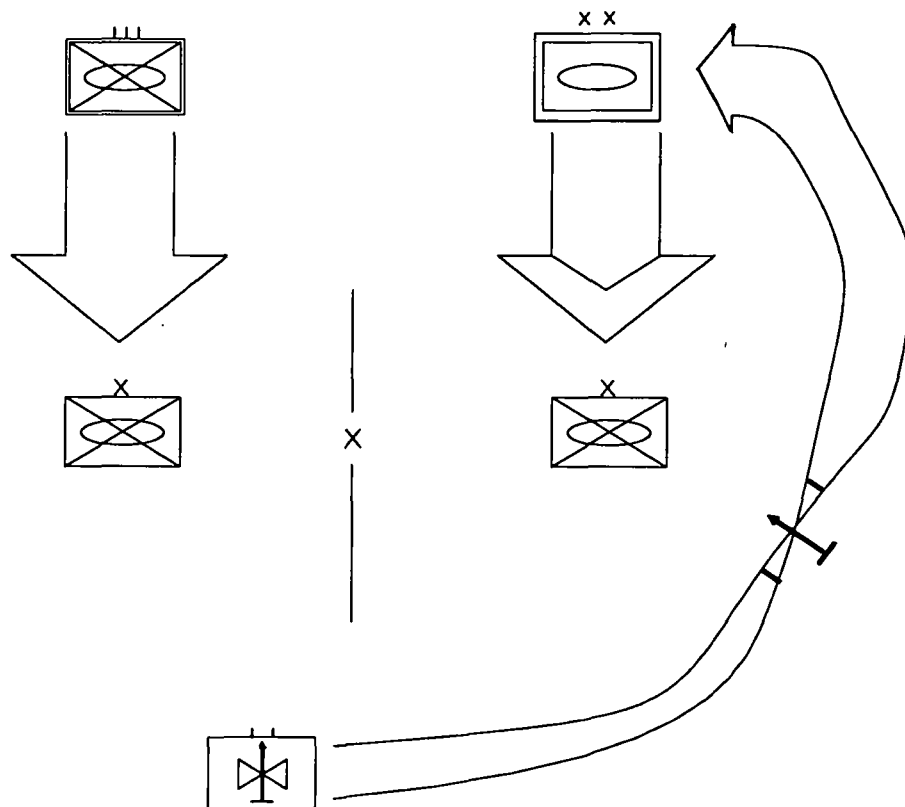


Figure 3-22. An ATKHB used to counter the enemy's main attack

(1) Attacking enemy second echelon battalions and regiments. While ground units engage the enemy from battle positions where they can range the leading elements of the enemy attack, the ATKHB maneuvers to attack the enemy's follow-on battalions and regiments simultaneously, attacking the enemy throughout its depth. Figure 3-23 shows an ATKHB attack in depth.

(2) Massing to defeat enemy penetrations. ATKHBs attack enemy penetrations along with other maneuver forces to defeat them and restore the FLOT. While other maneuver forces attack the head of the penetration, the ATKHB attacks the penetration in depth, denying the enemy commander the opportunity to mass, bypass, or withdraw. Once the enemy is encircled, the ATKHB can attack enemy breakouts or any other forces that may attempt to relieve the encircled enemy force. Figure 3-24 shows an ATKHB attacking with other maneuver forces to defeat an enemy penetration.

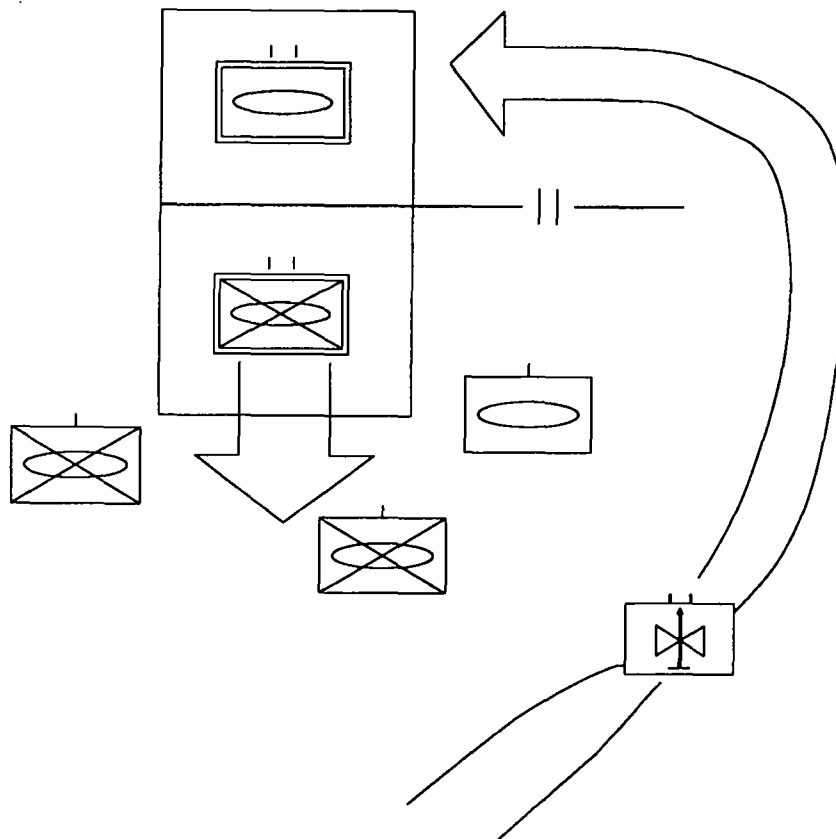


Figure 3-23. ATKHB attacks in depth

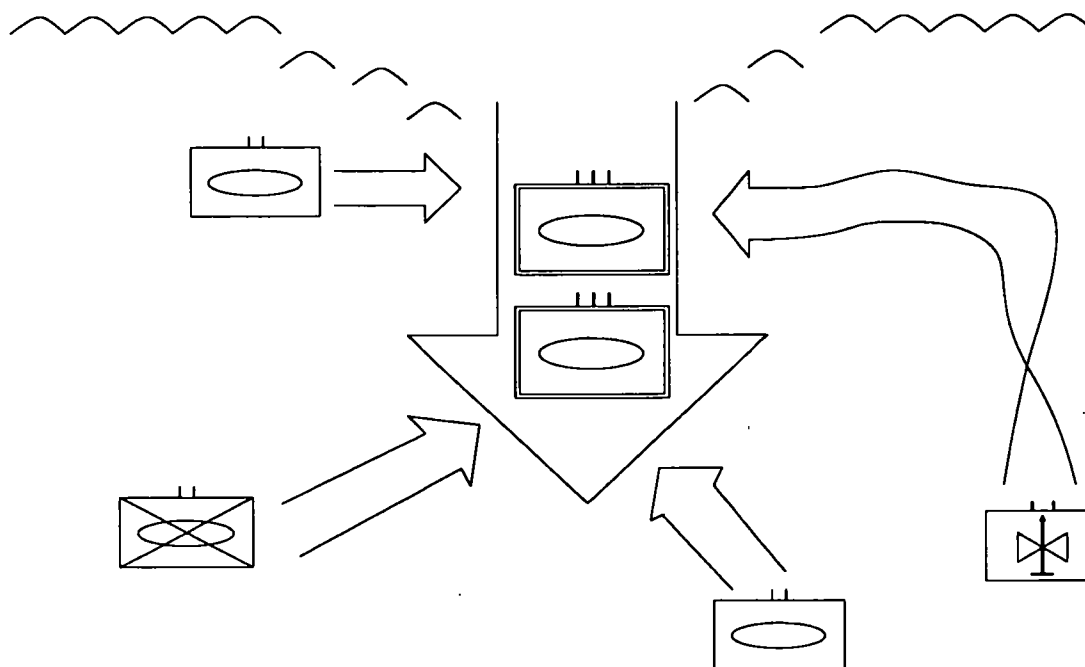


Figure 3-24. ATKHB massing with other maneuver forces to attack an enemy penetration

(3) Attacking to defeat enemy flanking forces. The ATKHB can be used to dominate avenues of approach into the rear and flanks of friendly forces. The ATKHB will reinforce the flank screen or guard to defeat the threat to the flanks of the main body.

3-22. REAR OPERATIONS

a. Rear operations are conducted to assure freedom of maneuver and continuity of operations from the corps rear boundary forward to the rear boundaries of committed maneuver units. ATKHBs, along with ground forces, have on-order missions to act as rapid reaction forces for Level III incursions into brigade, division, or corps rear areas. The ATKHB can rapidly react to enemy heliborne or airborne operations into the friendly force's rear area. The ATKHB should attempt to attack the enemy force in its assembly area or just as it arrives in its LZ. The ATKHB is especially valuable in rear operations when the enemy has air-landed or air-dropped light armored vehicles.

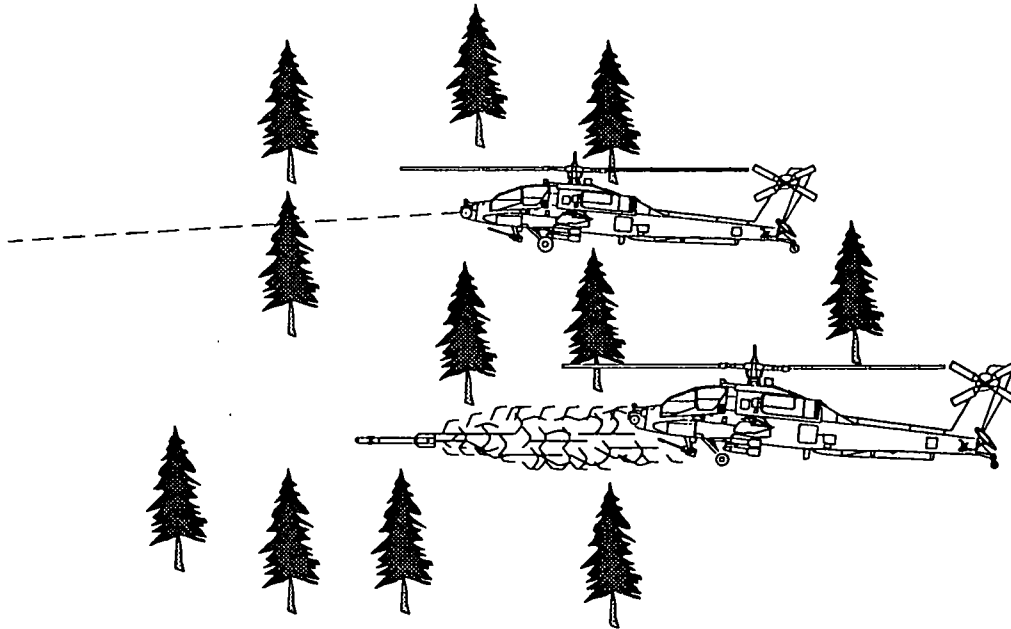
b. Once the enemy force has dispersed, the ATKHB is no longer as effective as other available forces. Major mechanized incursions into the rear area are attacked in the same manner as they are during close or deep operations. The ATKHB attacks until the force commander can respond with additional forces to defeat the penetration. During rear operations,

coordination between artillery, ADA, CAS, and ATKHBs must be accomplished by battalion and brigade liaison officers working in the division and corps rear operations cell of the rear CP.

c. Care must be taken to ensure that the targets that the ATKHB will attack are positively identified. Rear area commanders must coordinate closely with the supporting ATKHB to identify the locations of the enemy forces and provide control measures to deconflict friendly fires. Target handovers to elements of the ATKHB should be made by friendly forces in contact with the enemy.

Chapter 4

TECHNIQUES



This chapter discusses the techniques that are used by both AH-64 and AH-1 equipped ATKHBs and builds upon the information in Chapters 2 and 3 to illustrate how the missions are accomplished. All situations that may face leaders on the battlefield cannot be covered; therefore, leaders must use their own judgment regarding the tactics and techniques used for successful employment. This chapter is a guide to help leaders visualize some of the techniques available to them; however, the ultimate responsibility of fighting the battle remains with the leaders.

Section I

BASE TECHNIQUES

4-1. OCCUPATION

The manner in which ATKHBs occupy assembly areas, forward assembly areas, and holding areas does not differ between AH-1 and AH-64 equipped ATKHBs. Descriptions of these operational terms are covered in Chapter 3, paragraph 3-3.

a. Assembly Area. The assembly area is a battalion position. It is chosen based upon the mission of the battalion, the characteristics outlined in Chapter 3, a map reconnaissance, and a physical reconnaissance of the

selected area. Once an assembly area has been selected and coordinated, it is occupied when the mission for which it was selected is assumed. Occupation of the assembly area, which should be well planned and rehearsed, is a four-phase operation. These phases are: reconnaissance, quartering party arrival, main body arrival (ground and air), and position improvement.

(1) Reconnaissance. Aeroscouts conduct an area reconnaissance of the assembly area and surrounding terrain. As part of the reconnaissance, the aeroscouts should look for suitability of the area, NBC contamination, and signs of enemy activity. Upon completion of the area reconnaissance, aeroscouts brief the ATKHB commander/S3 and the quartering party on the results of the reconnaissance. Aeroscouts will continue to observe the new position until the arrival of the quartering party.

(2) Quartering party arrival. The HHC commander commands the quartering party, which should consist of at least two persons from each company and representatives of battalion headquarters. Before entering the assembly area, the quartering party conducts a ground reconnaissance to confirm the air reconnaissance, select ground routes into each company position, and establish initial area security. When the ground reconnaissance is completed, quartering party vehicles enter the assembly area. The priority of tasks for the quartering party is to--

- Conduct reconnaissance.
- Establish security.
- Install M-8 chemical alarms.
- Establish wire communications between the main CP location and company positions.
- Verify communications with higher headquarters.
- Initiate the local area defense plan.
- Select aircraft and ground vehicle locations.
- Prepare to meet and guide the main body.

(3) Main body arrival.

(a) Ground. The main body of the battalion will arrive in two parts beginning with the ground portion. When ground vehicles arrive, they are met by members of the quartering party who guide them along the selected routes to each company's position. The priority of tasks upon the closure of the main body is to--

- Establish security.
- Place observation posts on air and ground avenues of approach.

- Reestablish the main CP.
- Camouflage.
- Block high-speed avenues of approach that are not being used by the battalion.
- Begin operations.

(b) Air. Battalion aircraft should arrive after the ground portion of the main body. When the aircraft arrive, they should be positioned in predetermined locations selected by the advance party. The location of the aircraft should provide the maximum concealment that is available. Aircraft should not be congested nor lined-up. Aircrews should complete a postflight or throughflight inspection of their aircraft, report aircraft status, and then assist with the establishment of the assembly area.

(4) Position improvement. The assembly area is continuously improved as time allows. Some key areas that require continuous improvement are field sanitation, ground obstacles, camouflage, maintenance, and living conditions. Continuous camouflaging must be conducted to reduce the radar, heat, noise, electronic, and visual signatures of the battalion.

b. Forward assembly area. The forward assembly area is a battalion position occupied by battalion aircraft and a minimum number of ground vehicles. The selection of the forward assembly area is based upon the mission and the characteristics outlined in Chapter 3, paragraph 3-3. Planning for the occupation of the forward assembly area is not as detailed as that required for the occupation of an assembly area. However, because the battalion may remain in the forward assembly area for several hours, the commander and his staff must consider security and camouflage. Occupation of the forward assembly area is a three-phase operation. These phases are: reconnaissance, main body arrival, and security.

(1) Reconnaissance. Aeroscouts conduct an initial area reconnaissance (including NBC) of the forward assembly area and the surrounding terrain. Upon completion of the area reconnaissance, the aeroscouts brief the ATKHB commander or S3 and continue to observe the new position until the main body arrives.

(2) Main body arrival. Each company arrives at the forward assembly area as a separate unit and lands in its predetermined area. Normally, the battalion staggers the arrival of its companies by allowing several minutes to elapse between each arrival. The forward assembly area is designed to disperse the battalion while at the same time allowing the battalion to observe all of the high-speed avenues of approach into the forward assembly area.

(3) Security. Security of the forward assembly area is based on the ability of the battalion to detect threats and react to them by moving the aircraft to another location. Crews will complete a throughflight inspection of their aircraft immediately after forward assembly area security has been

established. Battalion aircraft must be prepared for a rapid departure. The priority of tasks for each company is to--

- Establish local security.
- Establish wire communications with the tactical CP.
- Complete throughflights of aircraft.
- Continue to plan missions.

c. Holding Area. Holding areas are company positions that are occupied for a limited time. The holding area is described in Chapter 3, paragraph 3-3. The selection of holding areas is made based upon the mission, location of the battle position, and the threat. Arrival at the holding area is a two-phase operation consisting of reconnaissance and occupation. Security of the holding area is maintained through observation, by limiting the time that the company is in the holding area, and by the company's ability to move rapidly if it is engaged by direct or indirect fires.

(1) Reconnaissance. The reconnaissance and occupation of the holding area is rapid and almost a single operation. Several kilometers before arriving at the holding area, the ATKHC transitions from a traveling overwatch formation to a bounding overwatch formation. The light platoon and the company commander then maneuver forward to conduct a reconnaissance of the holding area while the heavy platoon overwatches.

(2) Occupation.

(a) Once the holding area has been cleared, the ATKHC commander places his aircraft facing the 12 o'clock position, as shown in Figure 4-1. The light platoon occupies the holding area from the 12 o'clock position to the 6 o'clock position. The heavy platoon moves forward and occupies the holding area from the 6 o'clock position to the 12 o'clock position. The aircraft are positioned as directed by the ATKHC commander and are focused on air and ground avenues of approach. Each aircraft must remain at operating RPM and be positioned so that aircrews have visual contact with other aircraft in the holding area.

(b) Occupation of the holding area without aeroscout aircraft (OH-58A/C) is conducted basically the same as described in (a) above. The light attack section maneuvers forward under the control of the ATKHC commander and conducts a reconnaissance of the holding area while the heavy attack section overwatches. Upon completion of the reconnaissance, the commander places his aircraft in the 12 o'clock position and the light section covers the holding area from the 12 o'clock position to the 6 o'clock position. The heavy section then moves forward and occupies the 6 o'clock position to the 12 o'clock position.

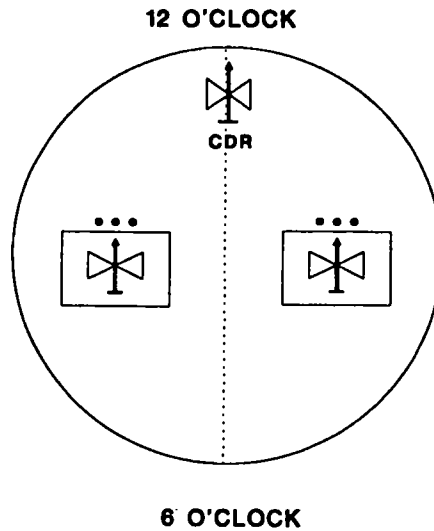


Figure 4-1. Occupation of the holding area

(c) If the ATKHC is engaged by direct or indirect fires, it must be prepared to move rapidly to an alternate holding area. Upon enemy contact, the company commander or the platoon leader in charge initiates movement by announcing the direction of movement (in relation to the 12 o'clock position) and the new holding area; for example, "Alpha, 6 o'clock; Iron 22, execute." If the ATKHC is under direct fire, the aircraft facing the enemy will attempt to suppress it with area weapons but will break contact as soon as possible. The ATKHC will attempt to keep or regain platoon integrity en route and conduct the occupation of the alternate holding area the same as described above. Figure 4-2 shows the actions of an ATKHC upon making enemy contact in the holding area.

4-2. EMERGENCY DISPLACEMENTS

An ATKHB is most vulnerable while occupying assembly areas and forward assembly areas. If an ATKHB comes under an artillery, a ground, or an air attack while it occupies an assembly area or forward assembly area, it must conduct emergency displacement actions. The two types of plans for emergency displacements are the early warning and the surprise displacement plans. A displacement plan enables the battalion to displace rapidly. It is part of the security for the assembly area or forward assembly area and must be established before the aircrews arrive. Displacement plans for each company will include the direction and route for leaving the area, the location of holding areas, alternate assembly areas or forward assembly areas, and battle positions. Areas to which the ATKHB will displace must be coordinated through the aviation brigade and the ground commander who controls the area.

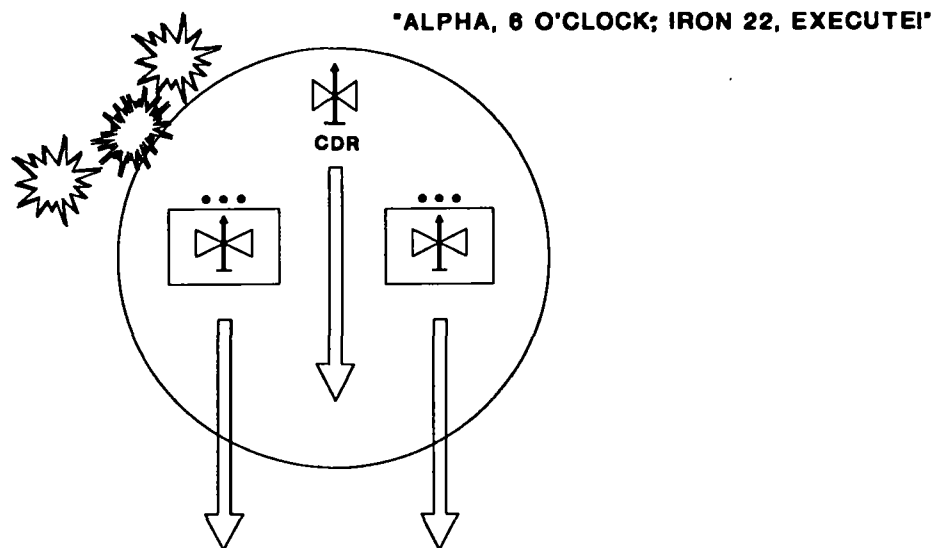


Figure 4-2. Enemy contact in a holding area

a. Early Warning. When an enemy attack is imminent, the ATKHC will initiate the battalion displacement plan on order. Aircraft depart the assembly area or forward assembly area using preselected routes and flight modes. Companies maintain platoon or section integrity, occupy their selected holding areas, and await further instructions from ATKHB headquarters.

b. Surprise. In the event of a surprise attack, the ATKHC will displace from its position without orders. Aircraft will depart individually and use the preplanned routes to holding areas. The first aircraft to arrive at the holding area conducts a reconnaissance and secures the area. Upon his arrival at the holding area, the ATKHC commander establishes control of the company, transmits a situation report to the battalion, and awaits further instructions. Aircraft systems' alignment and warm-up will be accomplished en route or at the holding area.

4-3. MOVEMENT

a. Principles of Overwatch. ATKHCs maneuver to fight the enemy in much the same way as mechanized maneuver forces. The major difference is that terrain does not hinder helicopter movement. The maneuvering force's use of terrain as an ally applies equally to both ground vehicles and attack helicopters. Therefore, the ATKHC must adapt its flight mode and technique of movement to maintain security. The principles of overwatch that apply to attack helicopter units are discussed below.

(1) Find the enemy with a minimum of forces. Aeroscouts move ahead of attack elements to assist in locating the enemy and reconnoiter the battle position. During the move, aeroscouts should provide rear security and reconnoiter frequently to locate enemy ground and air threats.

(2) Use all available cover and concealment. The ATKHC must use stealth to maneuver into position to engage the enemy. The use of the surrounding terrain and vegetation will allow the company to arrive undetected at the battle position.

(3) Overwatch lead elements and be prepared to fire and maneuver. This principle applies when the company approaches a battle position, attacks in sector, or takes part in an exploitation or a pursuit. The battlefield has no secure positions.

(4) Adjust the movement technique and type of terrain flight to the factors of METT-T. The ATKHC will use traveling, traveling overwatch, or bounding overwatch techniques depending on the likelihood of enemy contact. Low-level, contour, or NOE flight will be used as appropriate.

b. Movement Techniques.

(1) Traveling. Traveling is used when speed is important and contact with the enemy is not likely. Traveling is used to move rapidly in relatively secure areas; for example, in a corps or division rear area. The ATKHC can use traveling with both platoons in one flight or separate platoons in multiple flights. In either case, the company moves at a constant airspeed using the appropriate type of terrain flight.

(2) Traveling overwatch. Traveling overwatch is used when enemy contact is possible. Precautionary measures are justified, but speed is desirable. The ATKHC leads with its light platoon, which moves at a constant rate; the heavy platoon trails and moves as necessary to provide overwatch of the light platoon. The overwatching platoon observes the terrain where the enemy might be positioned to fire on the lead platoon.

(3) Bounding overwatch. Bounding overwatch is used when enemy contact is expected. From a covered, concealed position, the overwatching platoon monitors the progress of the bounding platoon. Each platoon may bound or overwatch in turn; however, the movement may also be executed with the light platoon always bounding and the heavy platoon always overwatching. The overwatch position should offer observation and fields of fire against potential enemy positions. Table 4-1 lists the techniques of movement, and Figure 4-3 shows the techniques of movement in relation to the battlefield.

Table 4-1. Techniques of movement		
Technique	Contact	Terrain Flight
Traveling	Not likely	Low-level or contour
Traveling overwatch	Possible	Contour or NOE
Bounding overwatch	Expected	NOE

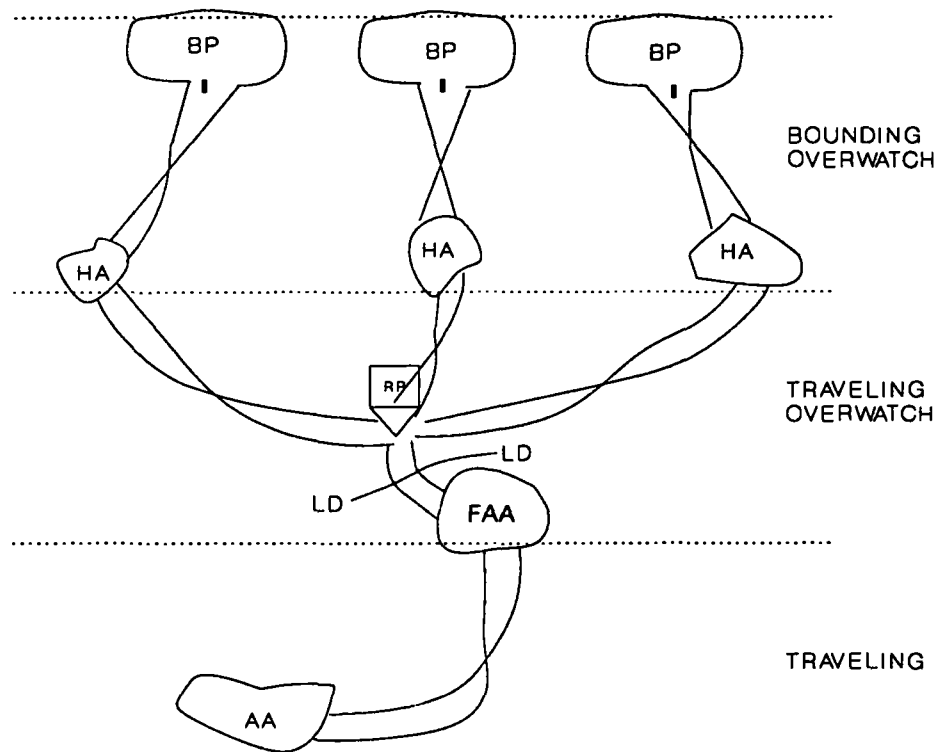


Figure 4-3. Techniques of movement on the battlefield

c. Axis of Advance. The effective movement of ATKHCs throughout the battlefield is one of the keys to mission success. The ATKHB uses an axis of advance, which is divided into routes for each ATKHC, between the forward assembly area and the battalion sector. It is planned and plotted to correspond with the A²C² plan, avoid known enemy concentrations, and take advantage of the terrain. The ATKHC routes within the axis are wide enough to allow for maneuver (approximately 3 kilometers wide or 1.5 kilometers either side of the centerline). Each company route is 4 to 5 kilometers apart (centerline to centerline) and uses the standard control measures of an LD or SP, ACP, and RP. The SPs, ACPs, and RPs are located along the centerline to orient the ATKHCs as they maneuver toward their sectors and holding areas. Figure 4-4 shows three separate routes (one for each company).

4-4. TACTICAL FORMATIONS

A leader must employ his aircraft as a synchronized unit. Proper use of tactical formations will enable a leader to maximize unit flexibility, maneuverability, firepower, and survivability. The basic aviation tactical unit is a two-aircraft formation of a lead aircraft and its wingman (lead/wingman team).

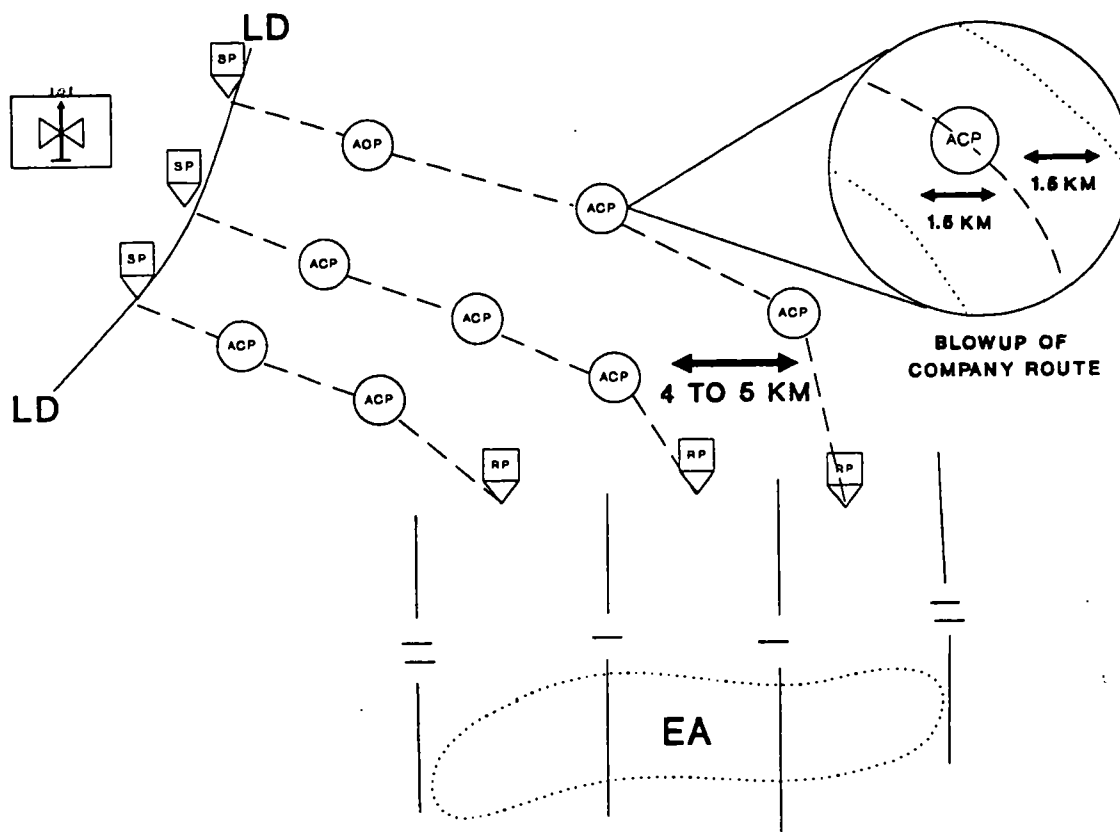
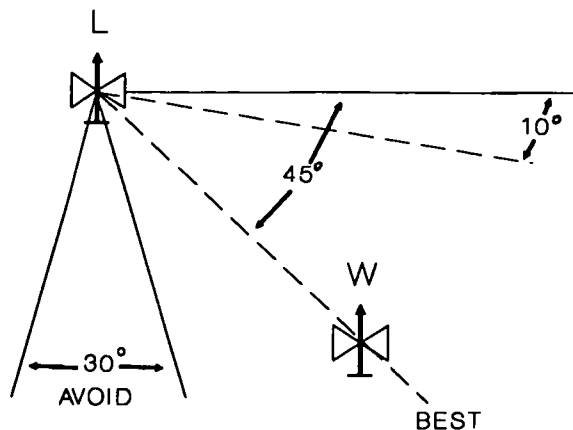


Figure 4-4. ATKHB axis of advance broken down into company routes

a. Lead/Wingman Team Formations. Two team formations that are specifically designed to increase team flexibility and security are combat cruise and combat spread. These formations are the building blocks of platoon and section formations. In each case, the lead aircraft designates the primary direction of travel and the wingman maintains his position in relation to the lead aircraft. The general rule for the lead/wingman relationship is: Follow me and do as I do. Team formations are purposely spread out. A spread-out formation allows the wingman to spend most of his effort searching for threats and less time watching the lead aircraft.

(1) Combat cruise. Combat cruise is a form of free cruise, but more restrictive. This formation is used when enemy contact is not likely or a part of a larger formation used by a platoon or section. It increases the team's freedom to maneuver and allows the wingman to provide security for his lead. Using combat cruise, the wingman should fly an arc from 10 to 75 degrees aft abeam the lead aircraft (right cruise) or the same approximate location on the other side of the lead aircraft (left cruise). The optimum position for the wingman is 45 degrees aft abeam the lead aircraft. As a minimum, the wingman should maintain a 150-meter (approximately 10 rotor diameters) separation from his lead. Aircrews will consider ambient conditions when deciding on the separation between aircraft. The wingman will remain either right or left cruise and change sides only after being directed

to do so by the lead aircraft or after he communicates to the lead aircraft his intentions to change sides. Figure 4-5 shows an example of a combat-cruise formation.



Aircraft maintain at least 150-meter separation.

Figure 4-5. Example of a combat-cruise formation

(2) Combat spread. The combat-spread formation is used when enemy contact is expected and a part of a larger formation. This formation promotes security by providing maximum firepower forward and overlapping fields of view. It is flown with the wingman in a plus or minus 10-degree abeam position on either the left or right side (spread left or right) of the lead aircraft. As a minimum, the wingman should maintain a 150-meter (approximately 10 rotor diameters) separation from his lead. Aircrews will consider ambient conditions when deciding on the separation between aircraft. Maximum lateral separation varies with visibility, the need to maneuver, and enemy weapon ranges. Figure 4-6 shows an example of a combat-spread formation.

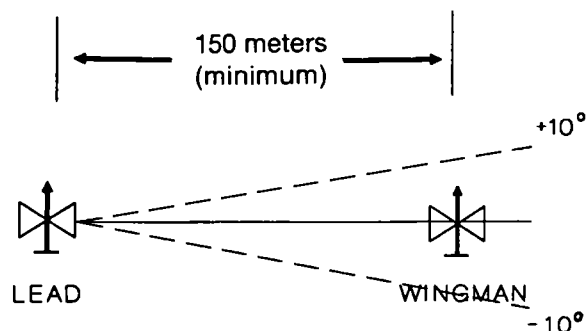


Figure 4-6. Example of a combat-spread formation

b. Platoon and Section Formations.

(1) Platoon and section formations are built from the lead/wingman team formations. The distance between the teams in a formation varies with terrain. Normal distance between the teams in a platoon or section formation

is not less than 300 meters. Examples of platoon and section formations are as follows:

(a) The wedge formation is formed by two combat-cruise formations (a left cruise on the left and a right cruise on the right). An example of a wedge formation is shown in Figure 4-7.

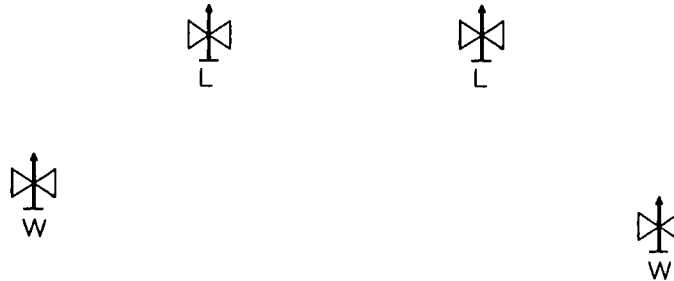


Figure 4-7. Example of a wedge formation

(b) The line formation is formed by two combat-spread formations abreast. An example of a line formation is shown in Figure 4-8.



Figure 4-8. Example of a line formation

(c) The trail formation is formed by two combat-spread formations (one behind the other). An example of a trail formation is shown in Figure 4-9.

(d) The staggered-left or staggered-right formation is formed by two combat-cruise formations (either left or right cruise), one behind the other. An example of a staggered right formation is shown in Figure 4-10.

(e) The echelon-left or echelon-right formation is formed by two combat-cruise formations (either left or right cruise) with the trail team approximately 45 degrees aft abeam the lead team. An example of an echelon-left formation is shown in Figure 4-11.



Figure 4-9. Example of a trail formation

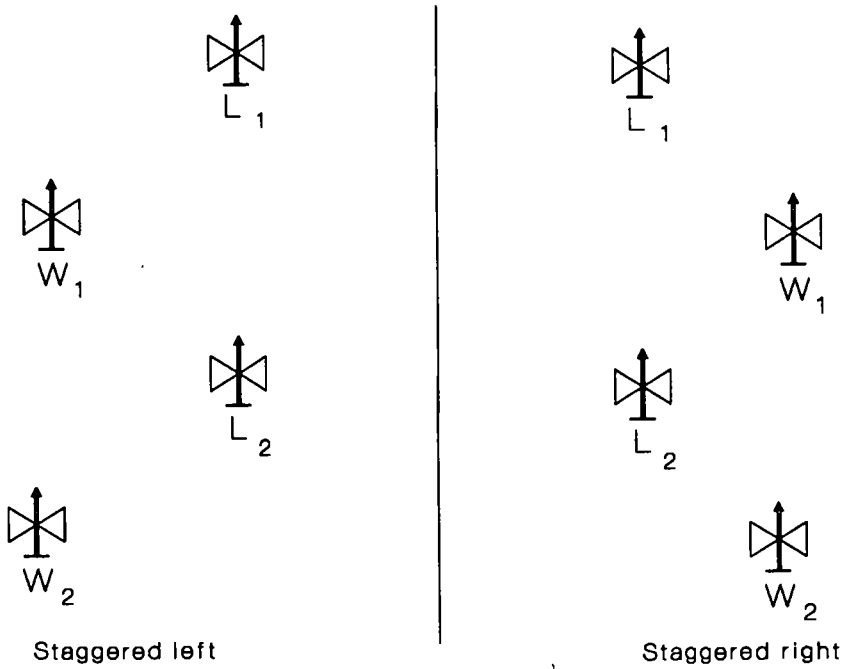


Figure 4-10. Example of a staggered-left or staggered-right formation

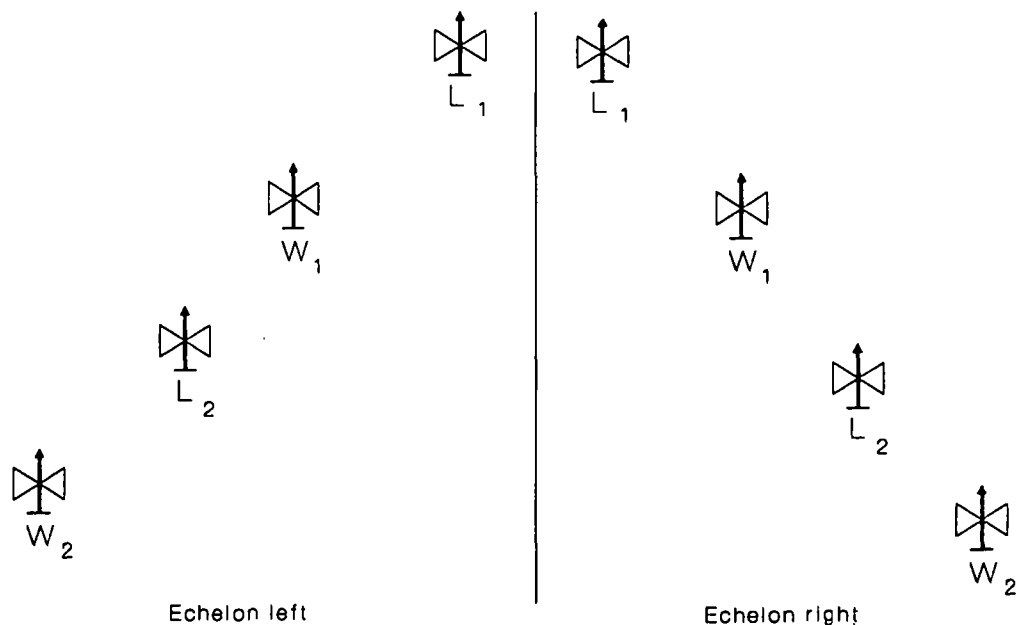


Figure 4-11. Example of an echelon-left or echelon-right formation

(2) ATKHC commanders use the platoon and section formations to aid in maneuvering their companies. Formations are chosen based upon the enemy situation and the movement technique used by the company. The figures that follow show different formations that company commanders may use in maneuvering their companies. Figure 4-12 shows heavy and light platoons in two wedge formations; Figure 4-13 shows a heavy section using a wedge formation and a light section and aeroscouts using the combat-spread formation; Figure 4-14 shows a heavy section in a staggered-left formation and a light section in a combat-spread formation; Figure 4-15 shows teams in trail formations; Figure 4-16 is an example of how an ATKHC would be dispersed in relation to terrain, movement technique, and formation being used.

4-5. PASSAGE OF LINES

A passage of lines is an operation in which one unit is passed through the position of another. The ATKHB does not pass through a unit in the same sense as a ground maneuver unit. The ATKHB will, however, pass through the airspace of other units' positions. Up to the coordinating altitude, this airspace is controlled by the ground commander. When it is unable to bypass a ground unit, the ATKHB must coordinate its movements over the ground unit through the use of the various echelons of A²C². However, when the ATKHB crosses forward of friendly lines, it should establish liaison with those units that will be passed, especially during a rearward passage of lines.

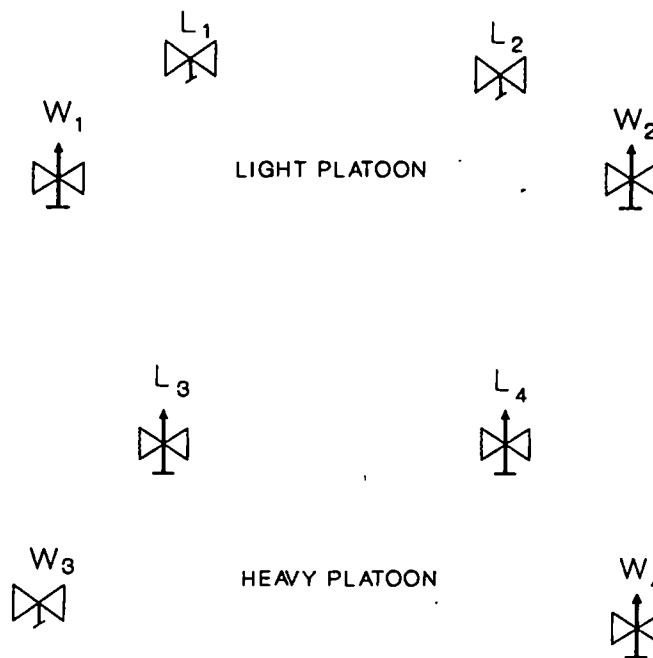


Figure 4-12. Heavy and light platoon using two wedge formations

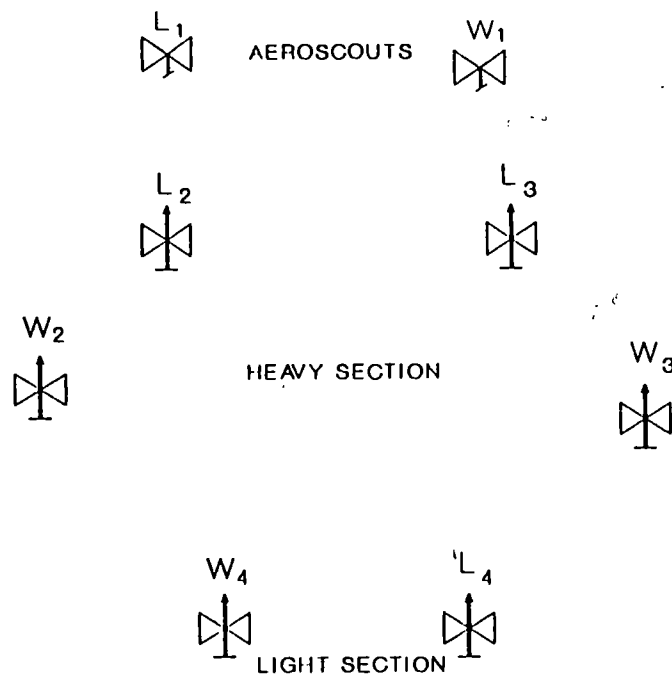


Figure 4-13. Heavy section using a wedge formation; light section and aeroscouts using combat-spread formation

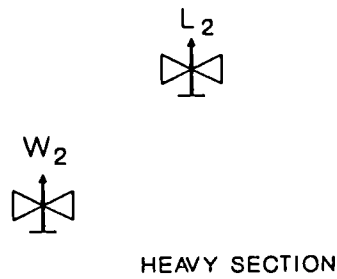


Figure 4-14. Heavy section in a staggered-left formation;
light section in a combat-spread formation



Figure 4-15. Teams in trail formations

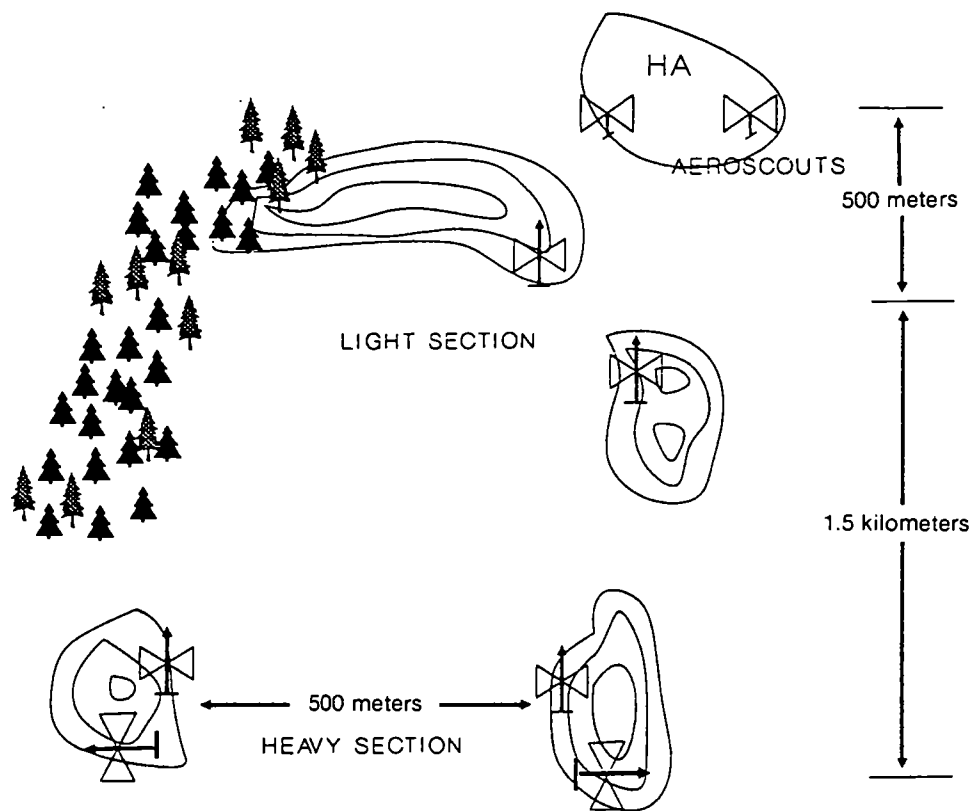


Figure 4-16. ATKHC dispersal in relation to terrain, movement techniques, and type of formation

a. A passage of lines is necessary when one unit cannot bypass another. The ATKHB may conduct a passage of lines to--

- Counterattack.
- Conduct a deep attack.
- Envelop an enemy force.
- Pursue a fleeing enemy.
- Exploit an attack by ground forces.
- Withdraw from a covering force mission.

b. The ATKHB commander must ensure that liaison is established with the stationary force. Early liaison ensures coordination and security for the execution of the passage of lines. The liaison officer is responsible for ensuring that ground commanders (down to company level) know the time and place of the passage of lines and the route that the ATKHB will be using. The liaison officer should be at the passage point when the ATKHB conducts

its passage of lines. Because of the nature of attack helicopter operations, this will mean that the liaison officer may be at the ground unit's location for several hours.

c. Direct and indirect fires of the stationary unit can be integrated into the SEAD plan of the passing ATKHB. Liaison will ensure coordinated and responsive support.

d. A thorough reconnaissance should be executed prior to the passage of lines. The reconnaissance should note existing and proposed troop locations. A technique to help ensure deception during a passage of lines is to limit the number and size of reconnaissance parties and use the vehicles of the stationary unit.

e. During the planning process, commanders and staffs of the units involved will coordinate--

- Exchange of intelligence.
- Exchange of SOI information.
- Exchange of liaison personnel.
- Arrangements for reconnaissance.
- Tactical cover and deception plans.
- Security measures during the passage.
- Fires and other combat support to be provided by the unit in contact.
- Air defense weapons status during the passage, which should be weapons hold.

Section II

THE AH-1 EQUIPPED ATKHB

4-6. FIGHTING THE BATTLE

Fighting the battle involves taking the plan that has been formulated and shaping it to fit the situation. To plan the battle, the ATKHC commander selects routes, flight modes, and platoon battle positions; coordinates fire control measures; devises a plan that considers the factors of METT-T; and accomplishes the mission. The ATKHC commander's plan must be flexible enough to allow for rapid deviation to meet the actual situation. When deciding his courses of action, the ATKHC commander must consider the mission, threat, movement, occupation of the battle position, fire control, and battle hand-over. He must also consider when to begin the engagement and when to maneuver.

NOTE: Except where noted otherwise, this section discusses an ATKHC task organization of heavy and light platoons, as discussed in Chapter 3, paragraph 3-1. When the aeroscout platoon is not used, the light attack section assumes the duties of the aeroscout.

a. Mission. The mission of the ATKHC is a subset of the mission assigned to the ATKHB. The success or failure of the ATKHB directly relates to the success or failure of its companies. ATKHC commanders use the ATKHB commander's intent and mission statement (attack to destroy, attrit, disrupt, deny avenue of approach, or overwatch) to decide how to accomplish the company's mission. However, it is possible that the ATKHC will have a mission that is different from that of the battalion. An example is an ATKHC that is supporting the attack of its parent battalion. The ATKHB has the mission to disrupt an enemy tank regiment, and one of the ATKHCs has the mission to deny an air avenue of approach into the ATKHB sector.

b. Threat. Just as the ATKHB conducts an IPB during planning, so must the ATKHC. The ATKHC IPB is based upon the IPB that is prepared by the ATKHB. It involves plotting the routes through the engagement area where groups of vehicles will maneuver and determining the location of priority targets and air defense systems. With this information, the ATKHC commander will be better prepared to select battle positions for his platoons and designate their sectors of fire.

c. Occupation of the Battle Position.

(1) Preparation. The occupation of a battle position begins when the aeroscouts reconnoiter the attack route from the holding area to the battle position. Once in the battle position, the aeroscouts deploy to clear the position, confirm map or previous physical reconnaissance information, and determine if the engagement area is occupied. Further ATKHC action depends upon the enemy situation.

(a) If the enemy has not yet arrived in the engagement area, the aeroscouts will continue to observe the engagement area and the battle position. The aeroscout sends the ATKHC commander a spot report on the enemy situation and the suitability of platoon battle positions. When the enemy arrives in the engagement area, an aeroscout returns to the holding area and gives the ATKHC commander a spot report. The commander then orders the platoons to move forward to the battle position using bounding overwatch. The light platoon leads, and the heavy platoon overwatches. At the battle position, each platoon takes up its assigned position and receives a target handover from the aeroscouts.

(b) If a battle handover is being accepted from another company or troop, the ATKHC commander and aeroscouts move to a holding area to meet with the ATKHC or reconnaissance troop whom they are relieving. Once the situation has been briefed, the ATKHC aeroscouts relieve the on-station aeroscouts and begin continuous observation. The ATKHC commander returns to the holding area and briefs the heavy and light platoons. He then orders the platoons to move forward to the battle position using bounding overwatch. The light platoon leads, and the heavy platoon overwatches. At the battle

position, each platoon takes up its assigned position and receives a target handover from the aeroscouts.

(c) When time is critical, such as when the enemy is already in the engagement area when aeroscouts arrive in the battle position, the commander may elect to use a radio call to order the attack sections forward. Attack sections move in a bounding overwatch along the attack route and meet their aeroscouts behind the battle positions. The aeroscouts direct the attack section to their platoon positions and give the attack aircraft a target handover.

(d) Both aeroscouts and attack aircraft provide security for the battle position. After the target handover to the attack aircraft, the aeroscouts move to a position to observe avenues of approach into the battle position. If an aeroscout makes contact with the enemy, he may engage with artillery or the ATKHC commander may maneuver one of the platoons into a supplemental battle position to meet the threat. The commander may position one of his platoons in an overwatch position to engage enemy air or ground threats.

(2) The engagement. Once the battle position is occupied, the ATKHC may begin the engagement with aircrews of individual aircraft engaging when they are ready. The engagement may also begin with an attack by platoon or a signal for the entire company to begin firing simultaneously. Based upon the situation, each technique has its advantages and disadvantages.

(a) Individual aircraft. Aircrews of individual aircraft may begin engaging the enemy as soon as they are positioned and have received the target handover. This technique would be most effective against enemy forces that are moving rapidly through an engagement area as the company occupies the battle position. Engaging individually will allow the company to bring the enemy under fire quickly and disrupt its maneuver. However, this technique offers the least control of company fires and may inhibit other attack aircraft from engaging targets successfully as the enemy employs its countermeasures.

(b) Attack by platoon. This technique gives the ATKHC greater control as platoon leaders direct fires. When sufficient time is available for the entire company to occupy the battle position, the ATKHC commander may control the start of the attack by beginning the engagement of each platoon on his order. He may, however, designate a TRP, phase line, or terrain feature as a trigger point where each platoon begins its engagement. Using this technique, the ATKHC may engage a rapidly moving enemy force when only one platoon is occupying a battle position and the other platoon is still maneuvering. This technique is also used when each platoon has different target priorities. Against a sophisticated threat, the light platoon may be required to suppress air defense assets with rockets at maximum range while the heavy platoon maneuvers. Once the air defense threat has been suppressed, the heavy platoon closes with the enemy and engages with TOW missiles.

(c) Simultaneous. A simultaneous engagement by both platoons may be used when sufficient time is available for the entire company to occupy the battle position. The ATKHC commander will initially control the fires of his company by beginning the engagement on his order or by using a trigger point. The entire company will begin firing simultaneously, attempt to gain fire superiority, and destroy the enemy before it can react. Figure 4-17 shows a possible expedient method of beginning an engagement.

d. Fire and Maneuver. The ATKHC will survive on the battlefield only if it seizes the initiative and keeps it. By continuously firing and maneuvering, the company seizes the initiative by bringing the enemy under fire from an unexpected direction and denying it the opportunity to fix the location of the ATKHC.

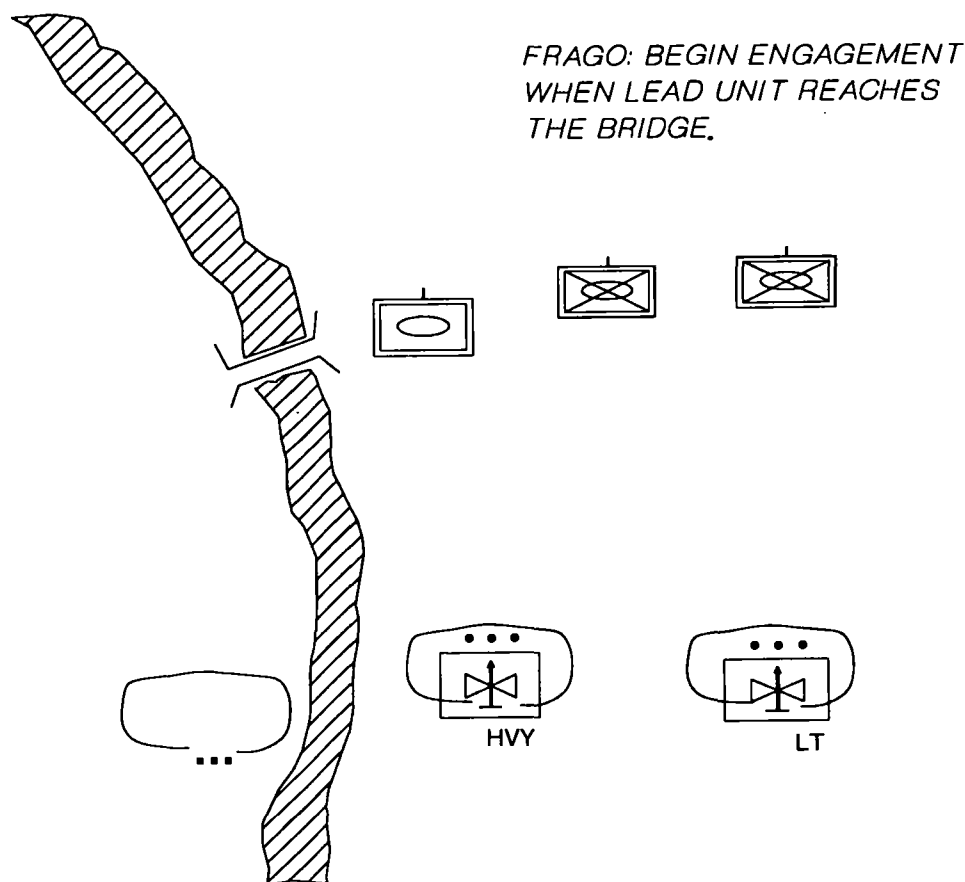


Figure 4-17. Beginning an engagement

(1) Maneuvering. The ATKHC maneuvers during an engagement to deny the enemy the ability to fix its location, platoons, or individual aircraft. The ATKHC also maneuvers to track the enemy through the engagement area. The ATKHC must have a series of battle positions to allow the platoons to follow the enemy as it presses forward or attempts to break contact. Maneuver also allows the ATKHC to take advantage of enemy weaknesses. If the enemy turns

into the ATKHC, the ATKHC maneuvers to alternate positions, which allows it to engage the enemy's flanks. When the enemy employs smoke, the ATKHC maneuvers to unobscured areas to engage. The ATKHC also maneuvers when it first attacks enemy air defenses with artillery and rockets then closes with the enemy force to engage TOW missiles. At times, enemy air defenses may be separated from a portion of the enemy force. In this case, the ATKHC maneuvers to take advantage of the lack of effective air defense fires by engaging unprotected elements. Figure 4-18 shows an ATKHC maneuvering to engage enemy flanks.

(a) By individual aircraft. Individual aircraft maneuver to deny the enemy a fixed target. Throughout the battle, attack aircraft unmask, acquire targets, engage, remask, and maneuver to a new firing position. Attack aircraft should fire only twice from any firing position before moving to a new position. However, when the enemy cannot effectively return fire, attack aircraft may engage many times before moving becomes necessary.

(b) By attack platoons or sections. ATKHC platoons maneuver to track the enemy or to take advantage of enemy weaknesses. They also use alternate and supplemental battle positions to fire and maneuver. As one platoon engages the enemy, the other maneuvers to an alternate position to continue the attack. Platoons/sections also fire and maneuver to suppress air defenses and to close with the enemy. The light platoon may begin the engagement by attacking air defenses with observed artillery fires and rockets. The heavy platoon maneuvers into TOW missile range and attacks after air defenses have been suppressed.

(2) Breaking contact. Breaking contact with the enemy is as important to the ATKHC as beginning the engagement. The break in contact should be swift, decisive, and leave the enemy in doubt as to whether it is still being engaged. The company may break contact by platoon or simultaneously.

(a) By platoon. Breaking contact by platoon is conducted the same as described for maneuvering by platoon. Rather than moving to another battle position, however, the platoon moves to a holding area, rally point, or FARP. When the company breaks contact, one platoon continues to engage the enemy while the other begins to egress. After the first platoon has cleared the area, the platoon still in contact uses artillery fires to suppress and blind the enemy, breaks contact, and maneuvers as directed by the company commander. In addition to artillery fires used to cover the break of the platoon, fires from another ATKHC, ground forces, or CAS may cover the break of the platoon in contact.

(b) Simultaneously. The ATKHC may break contact with the simultaneous departure of both platoons. Upon order, artillery fires are used to suppress and blind the enemy and the ATKHC breaks contact and maneuvers to a holding area, rally point, or FARP. In addition to artillery fires used to cover the break of the ATKHC, fires from another ATKHC, ground forces, or CAS may cover the break of the company in contact.

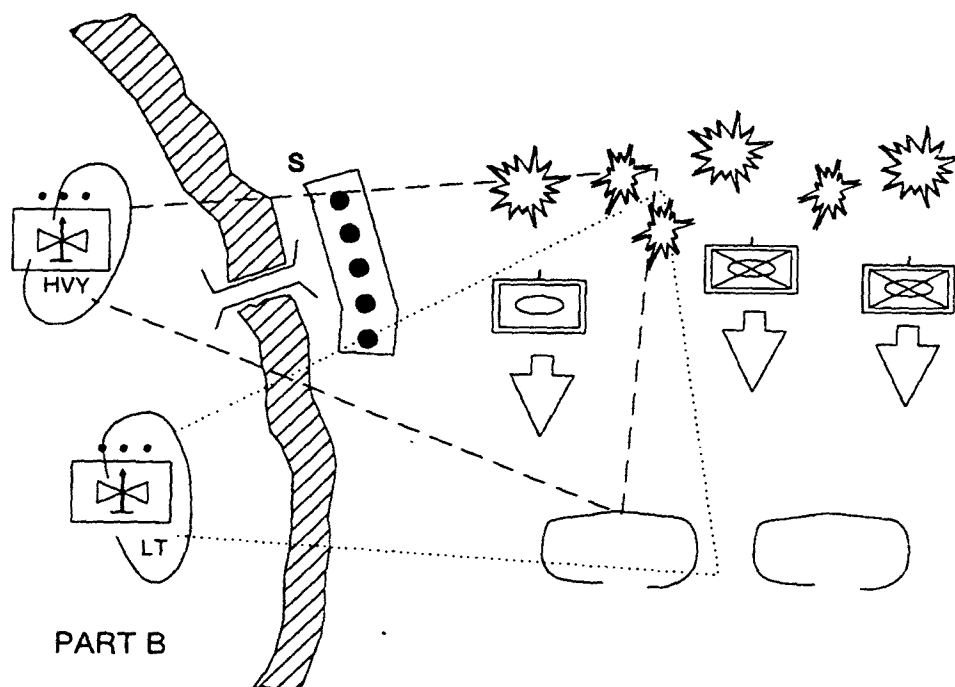
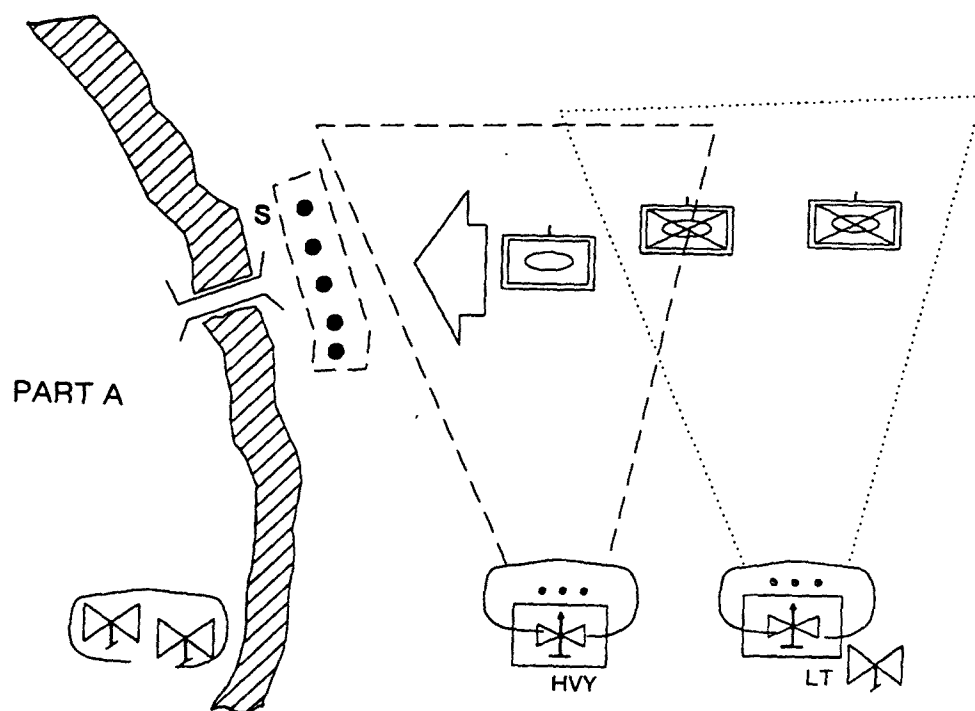


Figure 4-18. ATKHC maneuvering to alternate positions to engage enemy flanks

e. Battle Handover. A battle handover between ATKHCs is accomplished at the direction of the ATKHB and is used during continuous and phased employment of the battalion. By designating a phase line as the BHL, the ATKHB directs the ATKHC to prepare for a battle handover when issuing the OPORD or FRAGO.

(1) Briefing. As the time for the battle handover draws near, the aeroscouts of the ATKHC in contact briefs the relieving ATKHC on the situation. As a minimum, the briefing should include a description of the enemy force, its location, and direction of movement. If possible, the ATKHC commander in contact briefs the relieving commander face-to-face. If the ATKHC in contact cannot give a face-to-face briefing, then the relieving commander may receive an update briefing by radio.

(2) Execution. The enemy must not be allowed to recover and gain fire superiority through a break in battalion fires. Throughout the battle handover, constant pressure must be exerted on the enemy using direct and indirect fires. After receiving the handover briefing, the relieving ATKHC commander maneuvers his company into the battle positions. When the enemy force reaches the BHL, the ATKHC commander in contact signals the relieving commander by radio or another prearranged signal (smoke, rockets, or cannon/minigun fire) to begin his engagement. The relieving ATKHC then begins its attack while it covers the withdrawal of the relieved ATKHC. If the company in contact must depart before the relieving company occupies its battle position, the relieved company aeroscouts will maintain contact until the enemy has reached the BHL and a positive handover has been accomplished. The aeroscouts direct artillery fires on the enemy until the handover has been completed. Figure 4-19 shows a sample battle handover.

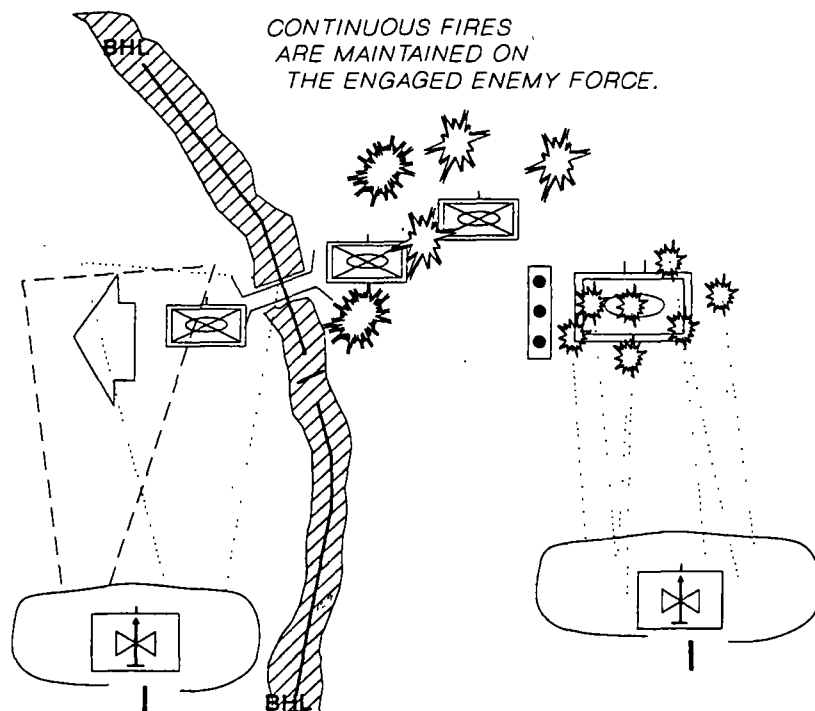


Figure 4-19. Battle handover

Section III

THE AH-64 EQUIPPED ATKHB

4-7. FIGHTING THE BATTLE

Fighting the battle involves taking the plan that has been formulated and shaping it to fit the situation. To plan the battle, the ATKHC commander selects routes, flight modes, and platoon battle positions; coordinates fire control measures; devises a plan that considers the factors of METT-T; and accomplishes the mission. The ATKHC commander's plan must be flexible enough to allow for rapid deviation to meet the actual situation. When deciding his courses of action, the ATKHC commander must consider the mission, threat, movement, occupation of the battle position, fire control, and battle handover. He must also consider when to begin the engagement and when to maneuver.

NOTE 1: The AH-64 has not changed the basic tactics that guide employment of the ATKHB. However, it does provide the ATKHB and its companies with greater combat power, mobility, speed of engagement, and survivability over battalions equipped with the AH-1.

NOTE 2: Except where noted otherwise, this section discusses an ATKHC task organization of heavy and light attack sections with an aeroscout platoon, as discussed in Chapter 3, paragraph 3-1. When the scout platoon is not used, the light attack section assumes the duties of the aeroscout.

a. Mission. The mission of the ATKHC is a subset of the mission assigned to the ATKHB. The success or failure of the ATKHB directly relates to the success or failure of its companies. ATKHC commanders use the ATKHB commander's intent and mission statement (attack to destroy, attrit, disrupt, deny avenue of approach, or overwatch) to decide how to accomplish the company's mission. However, it is possible that the ATKHC will have a mission that is different from that of the battalion. An example is an ATKHC that is supporting the attack of its parent battalion. The ATKHB has the mission to disrupt an enemy tank regiment, and one of the ATKHCs has the mission to deny an air avenue of approach into the ATKHB sector.

b. Threat. Just as the ATKHB conducts an IPB during planning, so must the ATKHC. The ATKHC IPB is based upon the IPB that is prepared by the ATKHB. It involves plotting the routes through the engagement area where groups of vehicles will maneuver and determining the location of priority targets and air defense systems. With this information, the ATKHC commander will be better prepared to select battle positions for his platoons and designate their sectors of fire.

c. Occupation of the Battle Position.

(1) Preparation. The occupation of a battle position begins when the aeroscouts reconnoiter the attack route from the holding area to the battle position. Once in the battle position, the aeroscouts deploy to clear the position, confirm map or previous physical reconnaissance information,

and determine if the engagement area is occupied. Further action depends upon the enemy situation.

(a) If the enemy has not yet arrived in the engagement area, the aeroscouts will continue to observe the engagement area and the battle position. The aeroscouts send a spot report of the enemy situation and the suitability of attack section battle positions. When the enemy arrives in the engagement area, an aeroscout returns to the holding area and gives the ATKHC commander a spot report. The commander then orders the attack sections to move forward to the battle position using bounding overwatch. The light attack section leads, and the heavy attack section overwatches. At the battle position, each attack section takes up its assigned position and receives a target handover from the aeroscouts.

(b) If a battle handover is being accepted from another company or reconnaissance troop, the aeroscouts move to a holding area to meet with the ATKHC or reconnaissance troop commander whom they are relieving. Once the situation has been briefed, the ATKHC aeroscouts relieve the on-station aeroscouts and begin continuous observation. The ATKHC commander returns to the holding area and briefs the heavy and light attack sections. He then orders the attack sections to move forward to the battle position using bounding overwatch. The light attack section leads, and the heavy attack section overwatches. At the battle position, each attack section takes up its assigned position and receives a target handover from the aeroscouts.

(c) When time is critical, such as when the enemy is already in the engagement area when aeroscouts arrive in the battle position, the commander may elect to use a radio call to order attack sections forward. Attack sections move in a bounding overwatch along the attack route and meet their aeroscouts behind the battle positions. The aeroscouts direct the attack section to their attack section positions and give the attack aircraft a target handover.

(d) Both aeroscouts and attack aircraft provide security for the battle position. After the target handover to the attack aircraft, aeroscouts move to a position to observe avenues of approach into the battle position. If an aeroscout makes contact with the enemy, he may engage with artillery or the ATKHC commander may maneuver one of the attack sections into a supplemental battle position to meet the threat. The commander may position one of his attack sections in an overwatch position to engage enemy air or ground threats.

(2) The engagement. Once the battle position is occupied, the ATKHC may begin its engagement with individual aircraft engaging when they are ready. The engagement may also begin with an attack by platoon or a signal for all aircraft to begin firing simultaneously. Based on the situation, each technique has its advantages and disadvantages.

(a) Individual aircraft. Aircrews of individual aircraft may begin engaging the enemy as soon as they are positioned and receive the target handover. This technique would be most effective against enemy forces that maneuver rapidly through an engagement area as the company occupies the

battle position. Engaging individually will allow the company to bring the enemy under fire quickly and disrupt its maneuver. However, this technique offers the least control of company fires and may inhibit other attack aircraft from engaging targets successfully as the enemy employs its countermeasures.

(b) Attack by attack section. This technique gives the ATKHC greater control as attack section leaders direct fires. When sufficient time is available for the entire company to occupy the battle position, the ATKHC commander may control the start of the attack by beginning the engagement of each attack section on his order. He may, however, designate a TRP, phase line, or terrain feature as the trigger point where each attack section begins its engagement. Using this technique, the ATKHC may also engage a rapidly moving enemy force when only one attack section is occupying a battle position and the other attack section is still maneuvering. This technique is also used when each attack section has different target priorities. Against a sophisticated threat, the light attack section may be required to suppress air defense assets with rockets at maximum range while the heavy attack section maneuvers. Once the air defense threat has been suppressed, the heavy attack section closes with the enemy and engages with Hellfire missiles.

(c) Attack by attack section using remote and autonomous fires. Attacking in this manner enhances ATKHC survivability because launch signatures of Hellfire missiles are hidden. Using this technique, the light attack section occupies a battle position to designate targets for the heavy attack section. The battle position of the heavy attack section is 2 to 3 kilometers behind the light attack section. On order or when the enemy reaches the trigger point, the light attack section begins designating targets for the heavy attack section. The priority of targets is enemy air defense assets. Once enemy air defenses have been destroyed, the light attack section begins autonomous engagements and the heavy attack section moves forward to the battle position to increase company fires with autonomous shots. Figure 4-20 shows the ATKHC using remote fires to begin the attack.

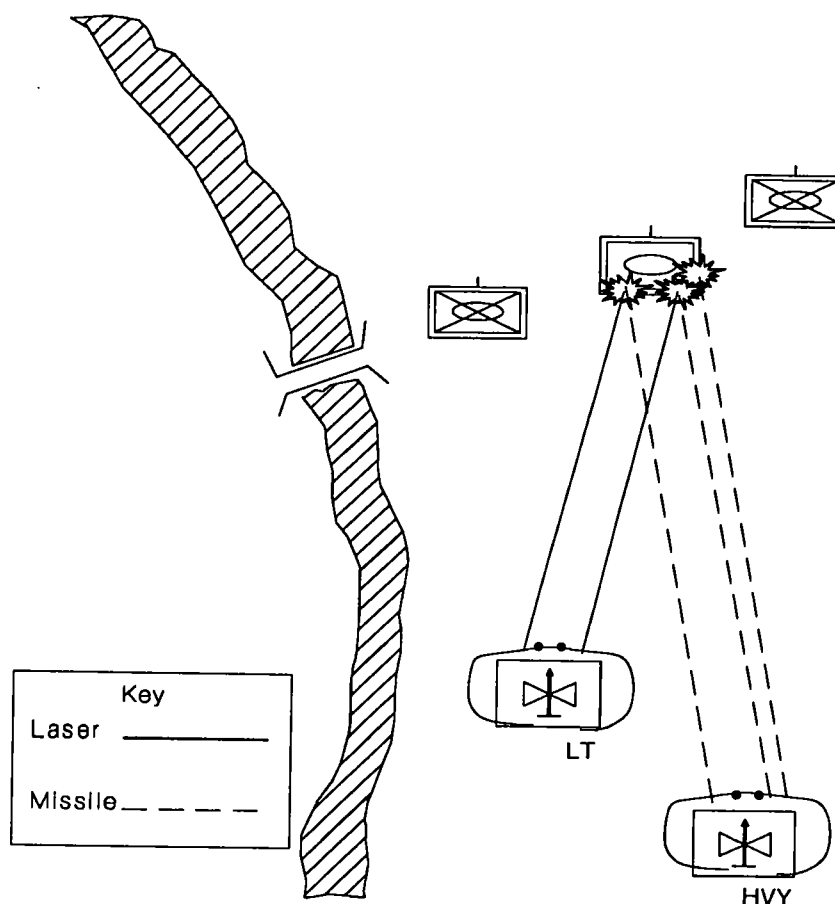


Figure 4-20. Attack sections using remote designation

(d) Attack by teams. The ATKHC commander may begin an attack by lead/wingman teams. Attacking by teams may develop in several ways. One team may designate for another team, one team member may designate for another team member, or all the teams may begin firing simultaneously. Figure 4-21 shows teams using remote firing to begin an attack.

(e) Simultaneous. A simultaneous engagement by both attack sections may be used when sufficient time is available for the entire company to occupy the battle position. The ATKHC commander will initially control the fires of his company by beginning the engagement on his order or by using a trigger point. The entire company will begin firing simultaneously, attempt to gain fire superiority, and destroy the enemy before it can react.

d. Fire and Maneuver. The ATKHC will survive on the battlefield only if it seizes the initiative and keeps it. By continuously firing and maneuvering, the company seizes the initiative by bringing the enemy under fire from an unexpected direction, achieving fire superiority, and denying it the opportunity to fix the location of the ATKHC.

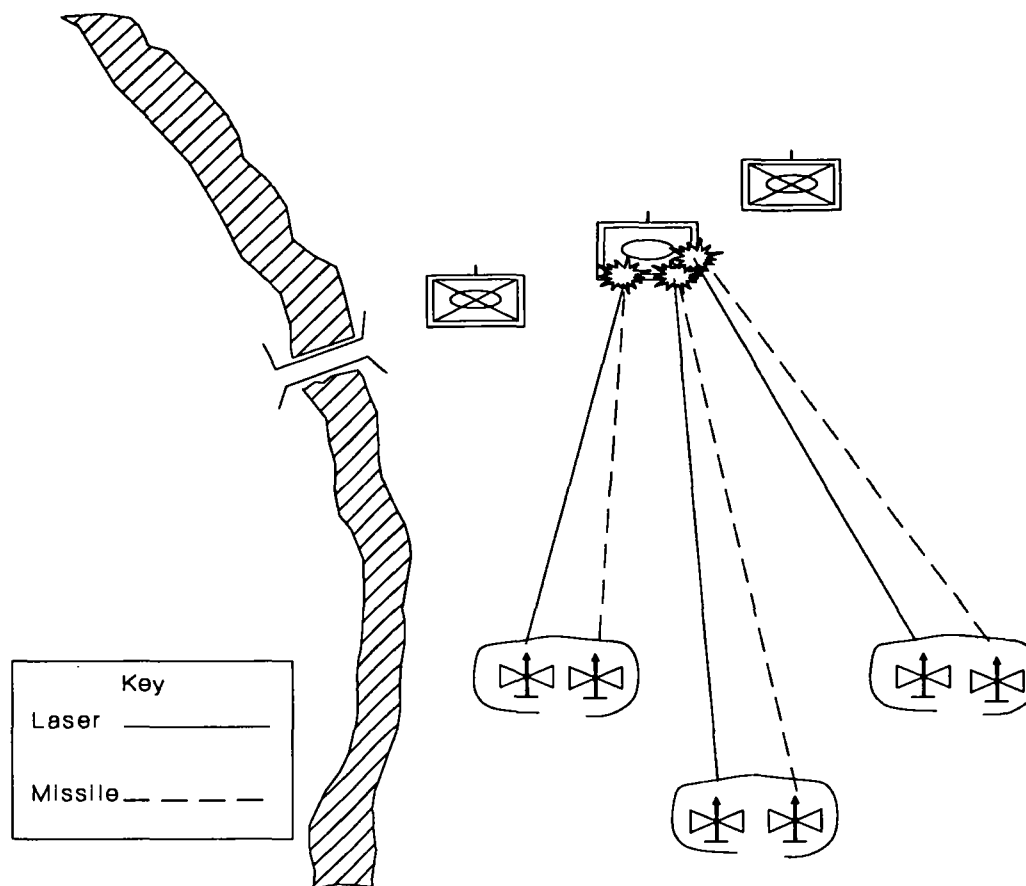


Figure 4-21. Lead/wingman teams using remote launches to begin an attack

(1) Maneuvering. The ATKHC maneuvers during an engagement to deny the enemy the ability to fix its location, attack sections, teams, or individual aircraft. The ATKHC maneuvers to track the enemy through the engagement area. The ATKHC must have a series of battle positions to allow its elements to follow the enemy as it presses forward or attempts to break contact. Maneuver also allows the ATKHC to take advantage of enemy weaknesses. If the enemy turns into the ATKHC, the ATKHC maneuvers to alternate positions, which allows it to engage enemy flanks. When the enemy employs smoke, the ATKHC maneuvers to unobserved areas to engage. It also maneuvers when it first attacks enemy air defenses with artillery and rockets then closes with the enemy force to engage Hellfire missiles. At times, enemy air defenses may be separated from a portion of the enemy force. In this case, the ATKHC maneuvers to take advantage of the lack of effective air defense fires by engaging unprotected elements. Figure 4-22 shows an ATKHC maneuvering to engage enemy flanks.

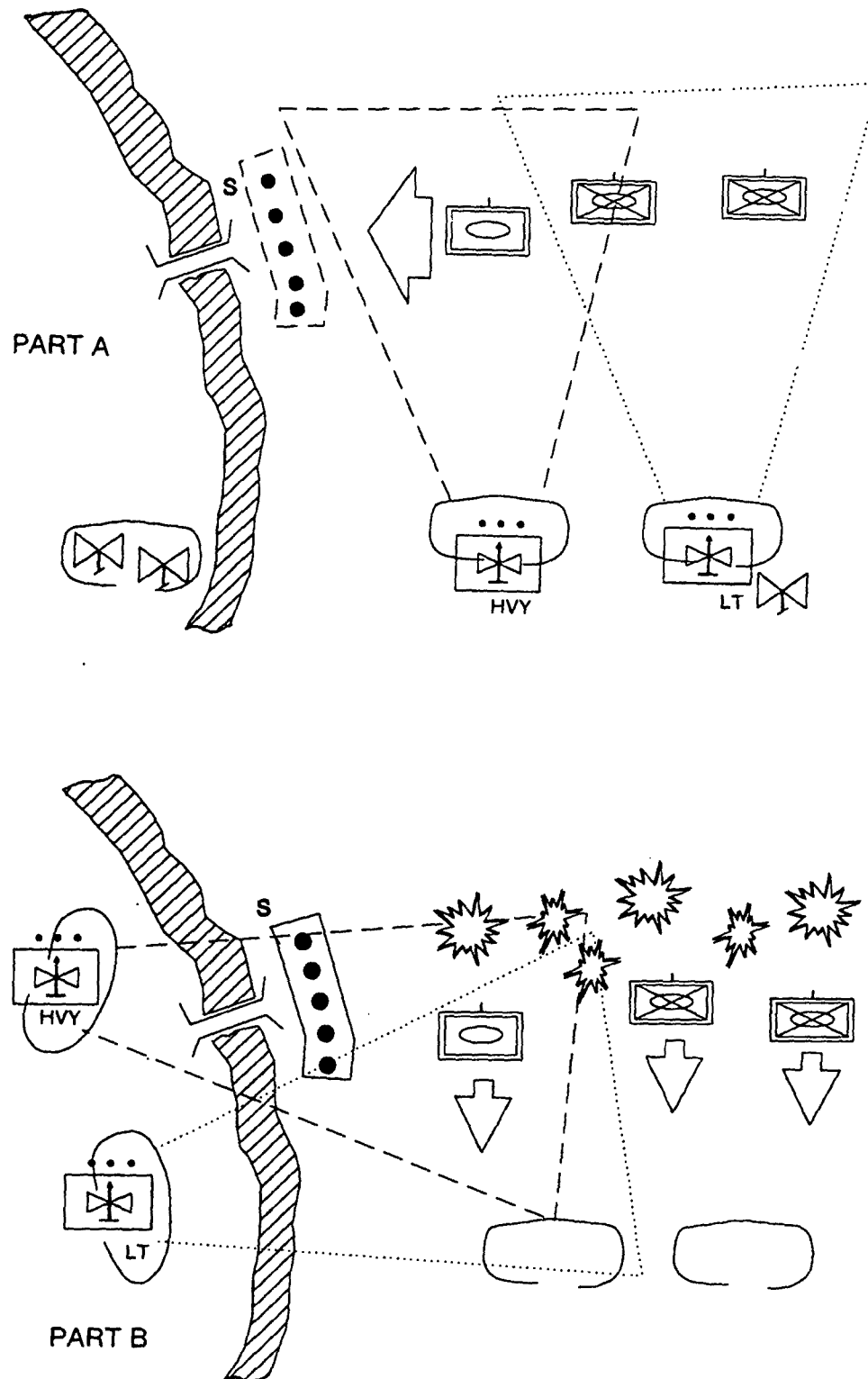


Figure 4-22. ATKHC maneuvering to engage enemy flanks

(a) By individual aircraft. Individual aircraft maneuver to deny the enemy a fixed target. Throughout the battle, attack aircraft unmask, acquire targets, engage, remask, and maneuver to a new firing position. Attack aircraft should fire only three times from any firing position before moving to a new position. However, when the enemy cannot effectively return fire, the attack aircraft may engage many times before moving becomes necessary.

(b) By attack section. Attack sections maneuver to track the enemy or to take advantage of its weaknesses. They use successive and alternate battle positions to fire and maneuver. As one attack section engages the enemy, the other attack section maneuvers to a successive position to continue the attack. Attack sections also fire and maneuver to suppress air defenses and to close with the enemy. The light attack section begins the engagement by attacking air defenses with observed artillery fires, rockets, and remotely fired Hellfire missiles. The heavy attack section maneuvers into range for autonomous launches and attacks after air defenses have been suppressed. As the attack sections attack and maneuver, the scout platoon provides flank reconnaissance and reconnoiters successive and alternate battle positions.

(c) By team. The ATKHC commander may use the speed and flexibility of his company by firing and maneuvering with lead/wingman teams. This method denies the enemy the opportunity to locate the ATKHC quickly. It also allows the ATKHC commander to maneuver his teams rapidly, exploit enemy weaknesses, track the enemy, and reposition assets to meet flank and rear threats. The ATKHC may have up to three teams, each occupying separate battle positions. These teams maneuver as directed by the company OPORD or by FRAGOs issued by the commander. They may also attack in coordination with each other; one team occupies a position where it can designate for another team that is in a remote firing position. While the teams attack and maneuver, the scout platoon provides flank reconnaissance and reconnoiters successive and alternate battle positions. Figure 4-23 shows teams using fire and maneuver to deny the enemy the opportunity to locate the ATKHC.

(2) Dispersal. The above techniques are used to disperse the ATKHC and deny the enemy the opportunity to engage the entire company simultaneously. However, the ATKHC commander must ensure that while his company is dispersed, company fires remain concentrated against the enemy force he is engaging.

(3) Breaking contact. Breaking contact with the enemy is as important to the ATKHC as beginning the engagement. The break in contact should be swift, decisive, and leave the enemy in doubt as to whether it is still being engaged. The company may break contact by attack section or simultaneously.

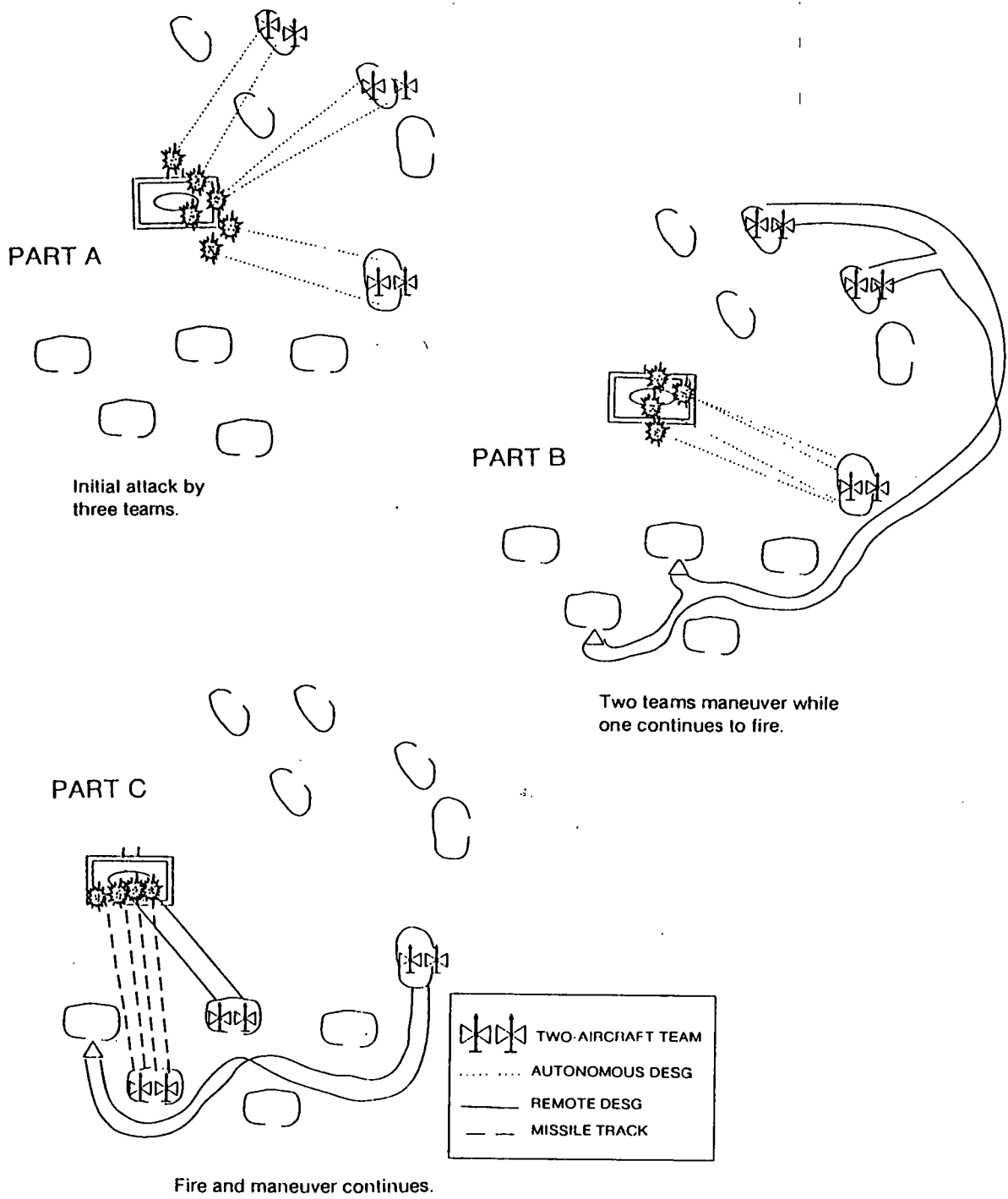


Figure 4-23. ATKHC fire and maneuver

(a) By attack section. Breaking contact by attack section is conducted the same as described for maneuvering by attack section. Rather than moving to another battle position, however, the attack section moves to a holding area, rally point, or FARP. When the company breaks contact, one attack section continues to engage the enemy while the other begins to egress. After the first attack section has cleared the area, the attack section still in contact uses artillery to suppress and blind the enemy, breaks contact, and maneuvers as directed by the company commander. In addition to artillery fires used to cover the break of the attack section, fires from another ATKHC, ground forces, or CAS may cover the break of the attack section in contact.

(b) Simultaneously. The ATKHC may break contact with simultaneous departure of both attack sections. Upon order, artillery fires are used to suppress and blind the enemy and the ATKHC breaks contact and maneuvers to a holding area, rally point, or FARP. In addition to artillery fires used to cover the break of the ATKHC, fires from another ATKHC, ground forces, or CAS may cover the break of the company in contact.

e. Battle Handover. A battle handover between ATKHCs is accomplished at the direction of the ATKHB and is used during continuous and phased employment of the battalion. By designating a phase line as the BHL, the ATKHB directs the ATKHC to prepare for a battle handover when issuing the OPORD or FRAGO.

(1) Briefing. As the time for the battle handover draws near, the aeroscouts in contact brief the relieving ATKHC on the situation. As a minimum, the briefing should include a description of the enemy force, its location, and direction of movement. If possible, the ATKHC commander in contact briefs the relieving commander face-to-face. If the commander in contact cannot give a face-to-face briefing, then the relieving commander may receive an update briefing by radio.

(2) Execution. The enemy must not be allowed to recover and gain fire superiority through a break in battalion fires. Throughout the battle handover, constant pressure must be exerted on the enemy by direct and indirect fires. After receiving the handover briefing, the relieving ATKHC commander maneuvers his company into the battle positions. When the enemy force reaches the BHL, the ATKHC commander in contact signals the relieving commander by radio or another prearranged signal (smoke, rockets, laser, or cannon fire) to begin his engagement. The relieving ATKHC then begins its attack while it covers the withdrawal of the relieved ATKHC. If the company in contact must depart before the relieving company occupies its battle position, the relieving company aeroscouts will maintain contact until the enemy has reached the BHL and a positive handover has been accomplished. Aeroscouts direct artillery fires on the enemy until the handover has been completed. Figure 4-24 shows a sample battle handover.

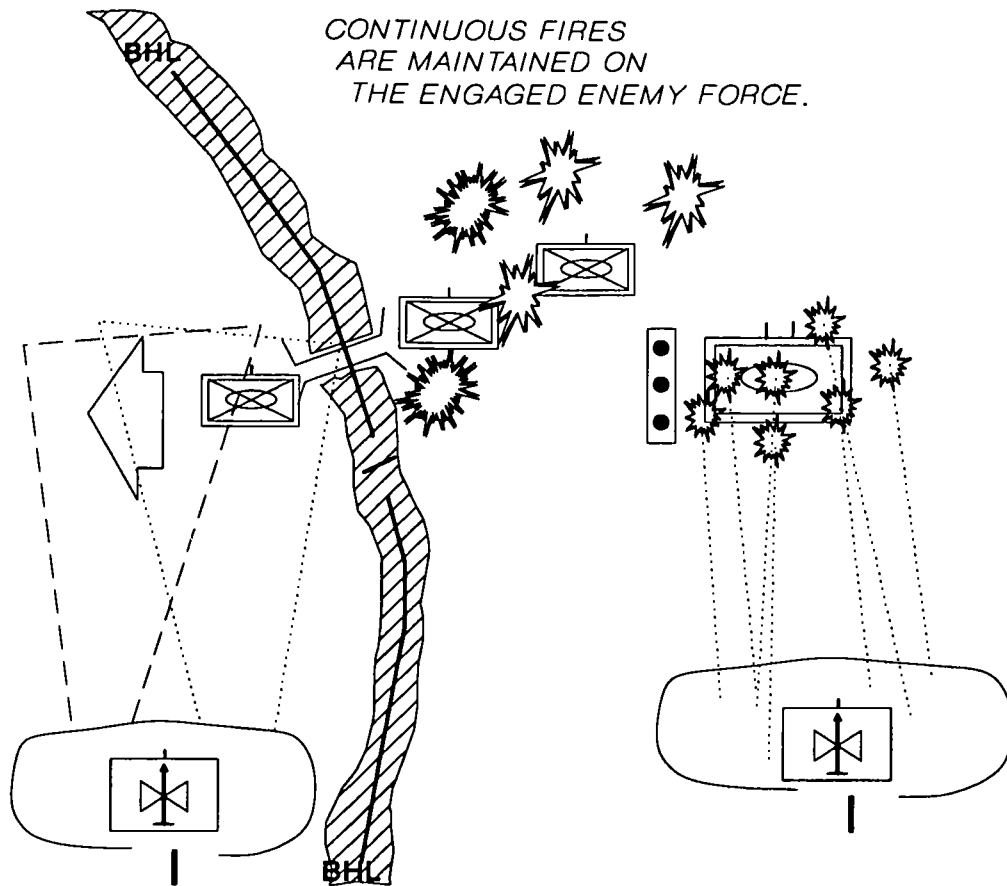


Figure 4-24. Battle handover



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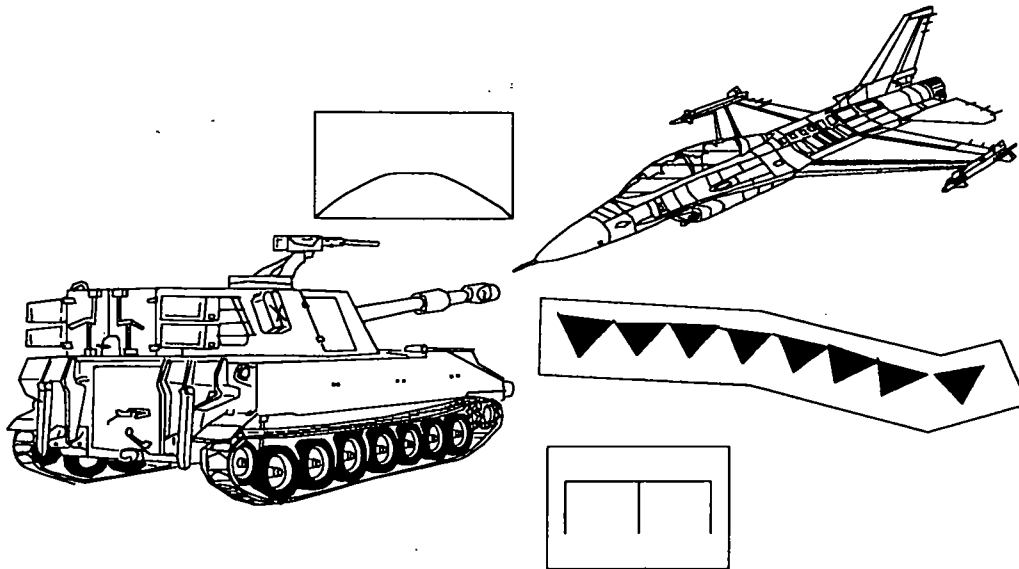
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Chapter 5

COMBAT SUPPORT



This chapter implements portions of STANAG 2404 (Draft).

Combat support for the ATKHB is provided from corps and division assets. The ATKHB commander uses combat support elements to enhance the combat power of the three ATKHCs. The ATKHB may receive combat support from DS, GS, OPCON, or units attached for specific missions. If the ATKHB is placed under OPCON of a ground maneuver brigade, it may receive combat support from units supporting that brigade. Combat support assets include air defense, field artillery, intelligence, engineers, and CAS. This chapter covers the roles of combat support in helping the ATKHB accomplish its mission.

5-1. AIR DEFENSE

The ATKHB has a demonstrated need for protection from enemy air assets. During a mid- to high-intensity conflict, friendly counterair assets will probably be unable to maintain air superiority at all times over the battlefield. The ATKHB will take active air defense measures by engaging and destroying enemy aircraft with their air-to-air systems, vehicular-mounted weapons, small arms, and supporting air defense systems. It must also take measures to avoid targeting by enemy air assets through passive air defense measures. These measures include camouflage and the reduction of electronic and visual signatures.

a. Active Air Defense. The ATKHB has a limited organic air defense capability. The firepower of ATKHB ground assets is limited to M2 and M60 machine guns and other small arms. However, these weapons can make a difference during an air attack. Small arms fires may not destroy attacking enemy aircraft but may distract the pilot enough for him to miss his target. FM 44-8 explains the use of small arms in the air defense role. Active air defense may also be taken by ATKHB aircraft during planned attacks against enemy air assets or through self-protection. FM 1-107 and Appendix B of this publication contain more information on active air defense operations.

b. Passive Air Defense. Target detection from the air is difficult. Enemy pilots must be able to see and identify a target to attack it. The effectiveness of high-performance Threat aircraft is greatly reduced when the ATKHB takes full advantage of terrain for cover and concealment. Cover and concealment must also be used to protect the battalion from ground observation. Enemy reconnaissance elements that penetrate friendly lines will be searching for ATKHB assembly areas for targeting by battlefield missiles, tactical aircraft, and tube artillery. Some passive air defense measures are discussed in the paragraphs that follow.

(1) Positions should be occupied that offer natural cover and concealment. Coverings should be placed on windshields, mirrors, and headlights of vehicles and canopies of aircraft. Vehicles and aircraft should be parked in tree lines. If this is not possible, aircraft and vehicles should be parked parallel to the tree line and in the shadows of the trees. Cities and small towns offer many areas to hide aircraft and vehicles. They also make it easier to hide the heat signature of an ATKHB. Inhabited areas have an inherent heat signature; wooded areas do not. Equipment should be parked so that it is not silhouetted against the skyline or an area of a different color.

(2) If available, covered, concealed routes should be used when the unit moves. If the unit is attacked while moving, vehicles should be turned 90 degrees from the direction of the attack because aircraft normally attack parallel to the movement of the convoy. This countermeasure removes vehicles out of the line of fire quickly.

(3) Communications security should be maintained.

(4) Vehicle track marks should be wiped out around positions. Also, pilots should be aware of the rotor wash path that helicopters leave in loose debris and snow.

(5) Vehicles and aircraft should be dispersed. This not only makes detection more difficult but also ensures that an aircraft making a single pass can attack only one piece of equipment.

(6) Air guards should be posted on vehicles and in dismounted positions to provide a warning of approaching aircraft. These air guards should be rotated frequently because scanning for long periods dulls an individual's ability to spot approaching aircraft. Although the use of

vehicle horns is a standard method of warning for an air attack, both visual and audible warning signals should be specified in the unit SOP.

c. Air Defense Planning. The commander establishes priorities for air defense within the area of operations. If augmented by attached air defense assets, the senior air defense officer or NCO will provide advice and make recommendations. The commander will analyze his area of operation, the terrain, probable intensity and types of enemy aircraft expected, and probable air avenues of approach. He must then balance his analysis of the threat against the available air defense weapons supporting his unit. After the commander establishes the priorities, the air defense officer and the S3 determine the specifics of air defense weapon allocation and what positions are to be occupied. The S3 continues to coordinate and supervise the activities of the supporting air defense force throughout the operation.

5-2. FIRE SUPPORT

Fire support is critical to the success of the ATKHB in combat. The ATKHB receives its artillery fire support from the echelon to which it is attached or to whom it is under operational control. An example is an ATKHB that is under OPCON of a ground brigade. In this relationship, the ATKHB receives its fire support from the artillery battalion that supports the brigade. The ATKHB commander and the FSO of the supported echelon integrate the firepower of field artillery, CAS and, when available, naval gunfire with the maneuver of the ATKHB to defeat the enemy.

a. Planning.

(1) One of the ATKHB commander's greatest challenges is to synchronize and concentrate all of his combat power at the critical time and place. There will be both a multitude of targets to engage in a short time and a time lag from the time the decision is made to use supporting fires until the target is hit. The commander alone will not have the time to integrate all of the weapons available to him in terms of concentrated combat power. The FSO assists the commander by developing the fire support plan concurrently with the maneuver plan. During the battle, the FSO and fire support section monitor the execution of fire support to ensure compliance with the commander's intent and to provide continuous support. When using fire support, the commander must consider the factors discussed below.

(a) Fire support to complement maneuver. Fires are used to accomplish missions that the ATKHCs cannot or that would otherwise divert forces from the main effort. An example is the use of artillery to engage air defense systems overwatching enemy movement.

(b) Surprise. Massed surprise fires are most effective. The destruction that can be achieved by supporting fire is proportional to the preparedness of the enemy.

(c) Most effective roles. To best integrate fire support, the ATKHB commander must know the capabilities and limitations of all supporting

fires and ensure that fire support is used where and when it will be most effective.

(2) The planning and coordination processes begin when the mission is received or assumed and never stop. The commander, XO, S2, S3, and the supporting FSO interact throughout mission planning and execution to ensure that fire planning is a continuing process. As the ATKHB commander shapes his plan for the employment of his battalion, he and the FSO develop the best use of fire support resources by determining the following:

- Which subordinate units to weight with fire support.
- What targets to attack.
- What fire support means to use.
- What target effect to achieve.
- What priorities to set for engaging targets and allocating fires.

(3) The commander must clearly state his intent for fire support. He must ensure that his fire support plan is developed accordingly, all available fire support is considered, and each phase of the plan is supported by the fire support plan. The FSO must understand completely the commander's requirements for fire support. Areas that the commander must coordinate with the FSO include the following:

(a) Scheme of maneuver (area of operation, timing of the attack, rate of movement, passage of lines, friendly ground forces in the area).

(b) Priority of fires (which unit has priority of artillery fires).

(c) Targets of concern (targets which, if not fired upon, will seriously impede mission accomplishment).

(d) Priority targets (what the priority targets are and how long they will be in effect).

(e) Effects of fire (suppression, neutralization, or destruction).

- Suppression limits the ability of personnel in the target area to perform their jobs. The effects of suppressive fire last only as long as the fires continue.
- Neutralization temporarily knocks the target out of action, producing 10 percent or more casualties. Most planned missions are neutralization fires.

- Destruction renders the target ineffective for a prolonged period of time. Destruction requires large quantities of ammunition or special munitions.

(f) Close air support (in coordination with the FAC, determines what is available, when it is available, and how it will be used).

(g) Fire support coordination measures (existing or proposed permissive or restrictive control measures established by higher headquarters or the ATKHB itself).

(h) Ammunition restriction (limitation on the use of smoke, improved conventional munitions, or other ammunition).

(4) Through the planning process, the commander determines how fire support will be used (what type of targets will be attacked, when, and with what means). The plan is flexible to accommodate the unexpected in combat.

(a) The depth and detail of fire support planning depends on how much time is available. Many of the fire support actions that occur in response to battle situations are established in SOPs or directed in FRAGOs. Fire support planning is continuous and concurrent at all levels.

(b) The fire support plan outlines the way artillery, CAS, and other fire support systems will be used to complement the scheme of maneuver, and it provides instruction for executing those fires. It is used to rank targets in priority order, match them with available fire support systems, eliminate duplication with the targets of the echelon that the ATKHB is supporting, and allow fires to be executed quickly without specific direction from the commander once the battle starts. An ATKHB fire support plan may include the following:

- A general concept of how fires will support the attack.
- A target list that includes locations where fires are expected or likely to be used. (Known enemy locations should be carefully targeted, but too many targets complicate the fire plan and delay fires.)
- A priority of fires telling which element will receive fire support in case of conflicting needs.
- A priority of targets telling which type of mission to fire first.
- An allocation of priority targets.
- An execution matrix for indirect fire weapons.
- Informal airspace coordination areas.
- Coordination measures for providing troop safety and synchronizing supporting fires.

(c) The battalion fire support plan is disseminated in the OPORD. This plan usually contains all the elements listed above and is modified as requests from the ATKHCs are received. Updated fire plans are sent back to the ATKHCs and disseminated to the DS battalion FDC and brigade FSE.

b. Specialized Conventional Munitions. The ATKHB commander and the FSO may develop an event-oriented scheme of fire support as they prepare the selected course of action. This fire support plan will require a specific FO, aeroscouts, or other element to fire a specific indirect fire system at a designated target when or if a specific event occurs.

(1) Artillery-delivered smoke. Artillery-delivered smoke is used to obscure or screen. WP provides a quick smoke build-up. HC, under the right weather conditions, provides sustained concealment.

(a) Obscuration fire. Placed on or near the enemy, this category of firepower uses smoke and WP ammunition to isolate the enemy and obscure its view of the battlefield. Because smoke is susceptible to changes in wind direction and the configuration of the terrain, its use must be coordinated with the ATKHB commander and all other friendly units affected by the operation.

(b) Screening fire. Screening fire also involves the use of smoke and WP. Screening fire, however, is used to mask friendly maneuvering elements in order to disguise their operations.

(2) Illumination. Even with the greater capability of night observation devices of US forces over potential adversaries, illumination fires are planned to assist command and control and, to a lesser extent, target acquisition. Although always planned, illumination fires are normally on order of the ATKHB commander. The following factors should be considered when illumination fires are being employed:

- Illumination fires are often necessary to assist aircraft which are not equipped with night observation devices to acquire and engage targets at night.
- Since the amount of illumination in basic loads is often low, expenditures must be monitored.
- Wind and other atmospheric conditions can affect the time it takes to get effective illumination.

(3) Scatterable mines. The family of scatterable mines gives the commander a rapid, flexible, and effective means to delay, canalize, harass, or wear-down enemy forces.

(a) The supported echelon commander may authorize the ATKHB commander to employ short-duration FASCAM minefields. FASCAM employment is then planned by the ATKHB commander and the S3 in coordination with the

supported echelon's engineer, S2, and FSO. Scatterable mines are included in the maneuver and obstacle plan. Upon approval of this plan, the FSO integrates field artillery delivered scatterable mines into the ATKHB fire support plan. The scatterable mines are then fired as directed by the ATKHB commander.

(b) The standard low density field artillery delivered scatterable minefield requires that a total of 30 rounds be fired to form a pattern that is roughly 400 x 400 meters. Employment time is generally 15 minutes (planned) to 30 minutes or longer (unplanned) from the time of the call for fire. The submunitions are set to self-detonate in either less than 24 hours (short duration) or more than 24 hours (long duration). Exact self-destruct times are classified and are given in TM 43-0001-28-1. Authority to employ long-duration, self-destruct scatterable mines is normally not delegated to battalion level.

(c) A FASCAM minefield is observable on the ground. These mines are most effective when tied into existing or reinforcing obstacles. As with other obstacles, FASCAM minefields must be covered by observation and direct and indirect fires.

(d) The firing unit is responsible for reporting the location of the minefield to the supported echelon's FSE. The supported echelon then informs higher, lower, and adjacent units of its location.

(e) Aerial employment of scatterable mines may be requested from the aviation brigade.

(4) Laser-guided projectiles. The Copperhead round is effective against stationary targets out to 5,000 meters from the laser designator. Depending on the skill of the operator, a Copperhead round can hit moving targets at 3,000 to 4,000 meters. However, it takes almost 5 minutes from the initial call for fire for the round to be fired, which limits the utility of this round for targets of opportunity. The requirement for the laser designator to "spot" the target for the final 13 seconds of flight also restricts the utility of this round.

c. Naval Gunfire. Naval gunfire can be an effective fire-support means when operations are conducted near a coastline with gunfire support ships within range. US Army units have only a limited organic capability to control naval air or naval gunfire. A US Marine Corps air naval gunfire liaison company normally provides this capability to a division. There are two organizations within the ANGLICO. Depending on which organization is available, the ATKHB will receive either a shore fire-control party or a battalion supporting arms liaison team and firepower control teams. These ANGLICO elements request, coordinate, and control naval air and naval gunfire.

d. Fire Support Coordinating Measures.

(1) Fire support graphics are not the same as maneuver graphics. An FSO uses fire support coordinating measures to facilitate rapid coordination

and provide safeguards for friendly troops, vessels, aircraft, and installations. Usually, a coordinating measure is recommended by the FSCoord, established by the force commander, and graphically portrayed on maps, charts, and overlays in the FSE. As a minimum, the measures will provide the following information:

- A graphic depiction of the measure.
- An abbreviation of the control measure.
- The headquarters that established the measure.
- An effective DTG and termination DTG, if appropriate.

(2) As shown in Table 5-1, fire support coordinating measures fall into two categories: permissive measures and restrictive measures. With a permissive measure, no further coordination is required for the engagement of targets affected by that measure. A restrictive measure imposes certain requirements for specific coordination before engaging targets affected by that measure. Both permissive and restrictive measures are noted in black on situation maps.

Table 5-1. Fire support coordinating measures	
Permissive measures	
- Coordinated fire line	
- Fire support coordination line	
- Free-fire area	
Restrictive measures	
- Restrictive fire line	
- Restrictive fire area	
- No-fire area	
- Formal and informal airspace coordination areas	

(3) Maneuver boundaries serve as both permissive and restrictive measures. They are permissive because they allow maneuver and fire support the freedom to operate without coordination within their limits. However, employment across boundaries requires coordination. The most commonly used fire support coordinating measures are discussed in the following paragraphs.

(a) Coordinated fire line. A coordinated fire line is a line beyond which mortars, field artillery, and naval gunfire may deliver surface-to-surface fires in a sector without coordination. A CFL is established at brigade, independent battalion, or higher headquarters. Figure 5-1 shows a coordinated firing line.

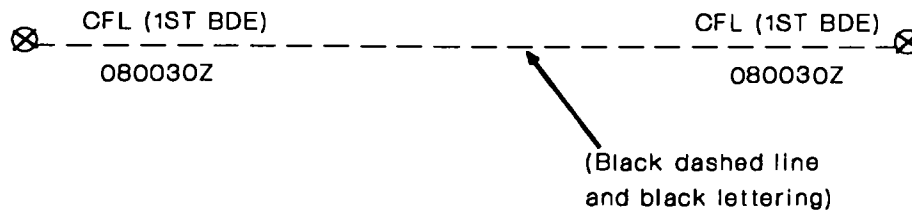


Figure 5-1. Coordinated fire line

(b) Fire support coordination line. A fire support coordination line is a line beyond which all fire support means may attack targets without coordination. An FSCL is established on identifiable terrain by corps or an independent division headquarters. Figure 5-2 shows a fire support coordination line.

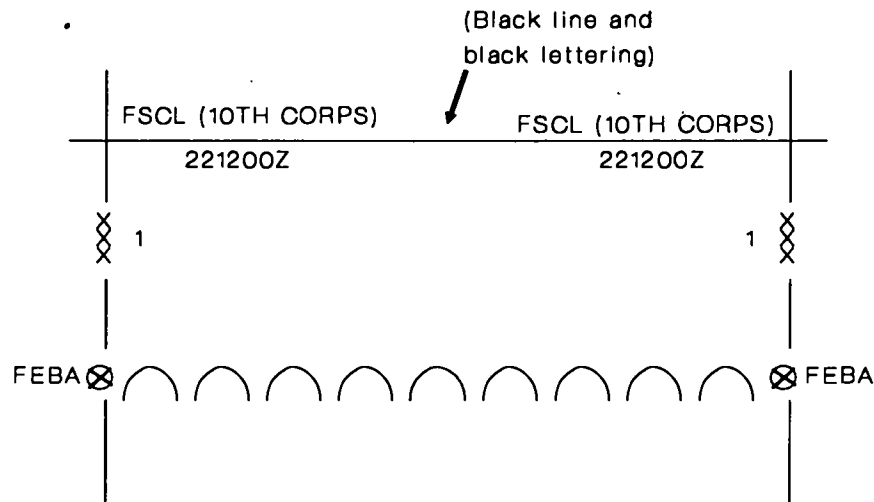


Figure 5-2. Fire support coordination line

(c) Free-fire area. A free-fire area is a designated area into which any fire support agency may deliver fires without coordination with the establishing force headquarters. Figure 5-3 shows a free-fire area.

(d) Restrictive fire line. A restrictive fire line is a line between two converging forces across which fires may not be delivered without coordination between the affected forces. It is established on identifiable terrain by the common commander of the converging forces. Figure 5-4 shows a restrictive fire line.

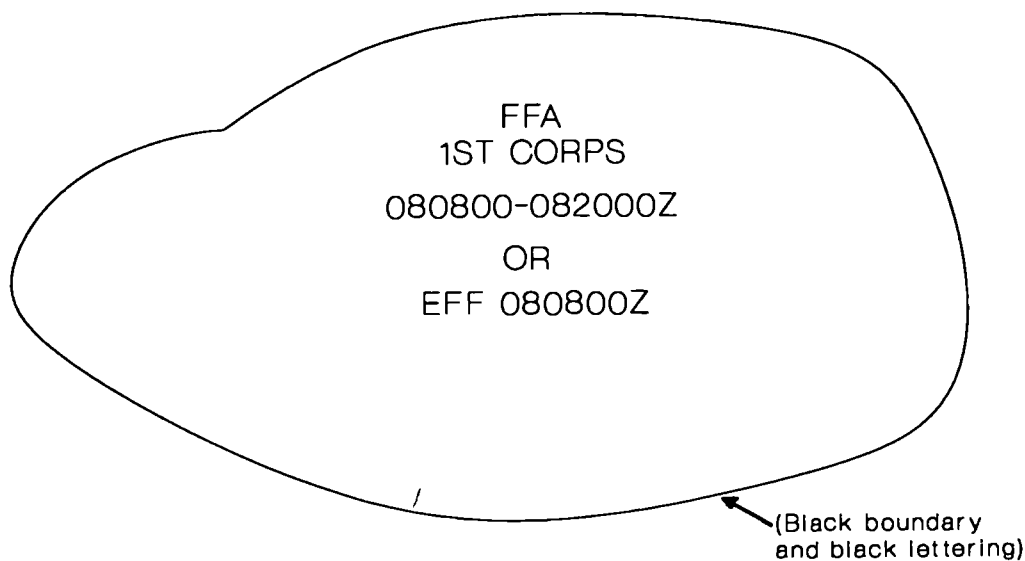


Figure 5-3. Free-fire area

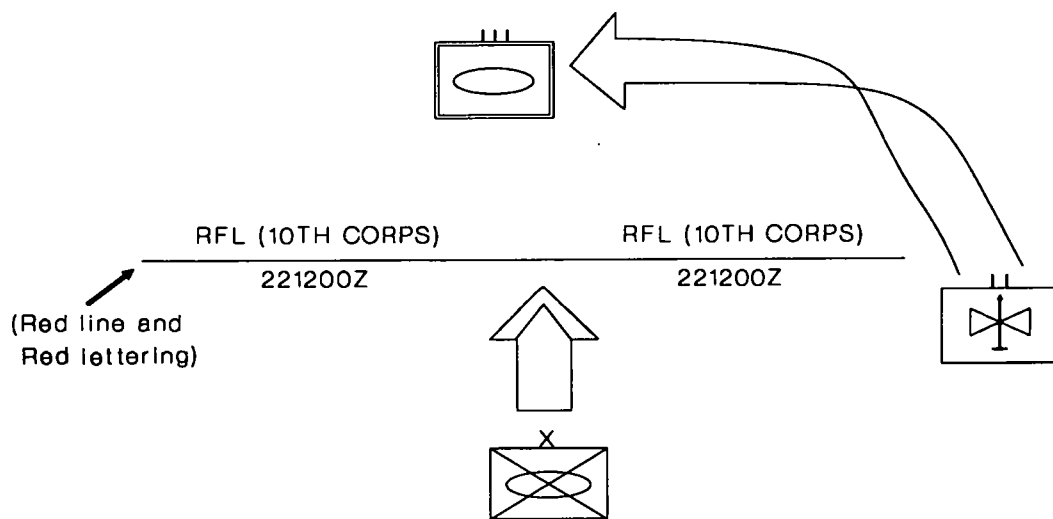


Figure 5-4. Restrictive fire line

(e) Restrictive fire area. A restrictive fire area is a designated area where specific restraints have been imposed and fires cannot exceed those restraints without approval from the establishing force headquarters. An RFA is established by battalion or an independent company or higher headquarters. Figure 5-5 shows a restrictive fire area.

(f) No-fire area. A no-fire area is a designated area where no fires or effects from fires will penetrate. Figure 5-6 shows a no-fire area.

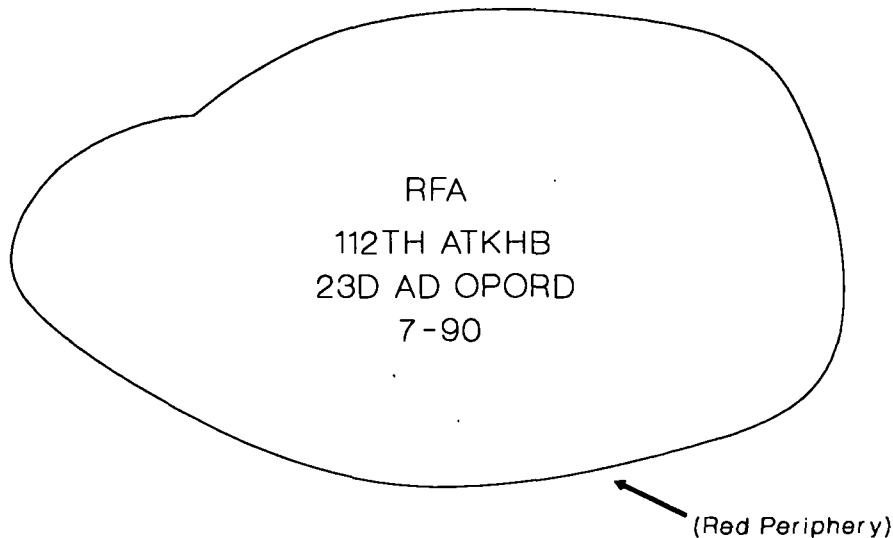


Figure 5-5. Restrictive fire area

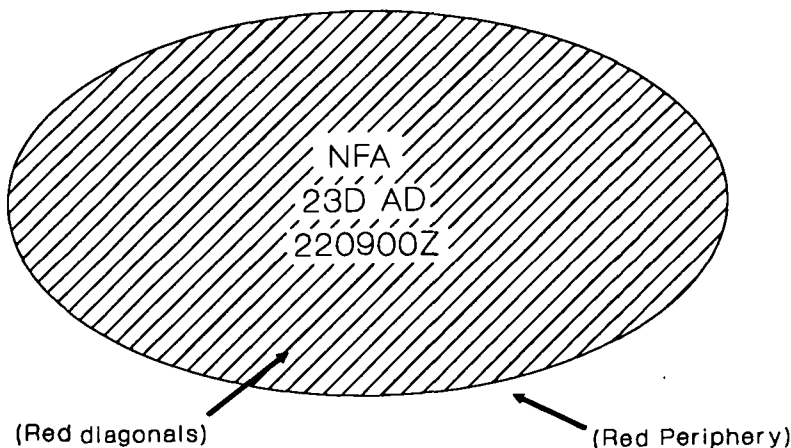


Figure 5-6. No-fire area

(g) Informal airspace coordination area. The informal ACA is normally used for immediate air strikes. It can be a time-distance separation or a terrain feature separation of the attacking air and surface fires. As shown in Figure 5-7, CAS fires are permitted only north of the highway and surface-to-surface (for example, field artillery) fires are allowed only to the south of the highway. The time restriction is 0900 to 0945 and applies to both fire support means. The informal ACA is established at task force or higher level and is normally not depicted on charts or maps.

(h) Formal airspace coordination area. The formal airspace coordination area is a three-dimensional block of airspace in which friendly aircraft can fly without fear of being hit by friendly fire. It is established by brigade or higher headquarters.

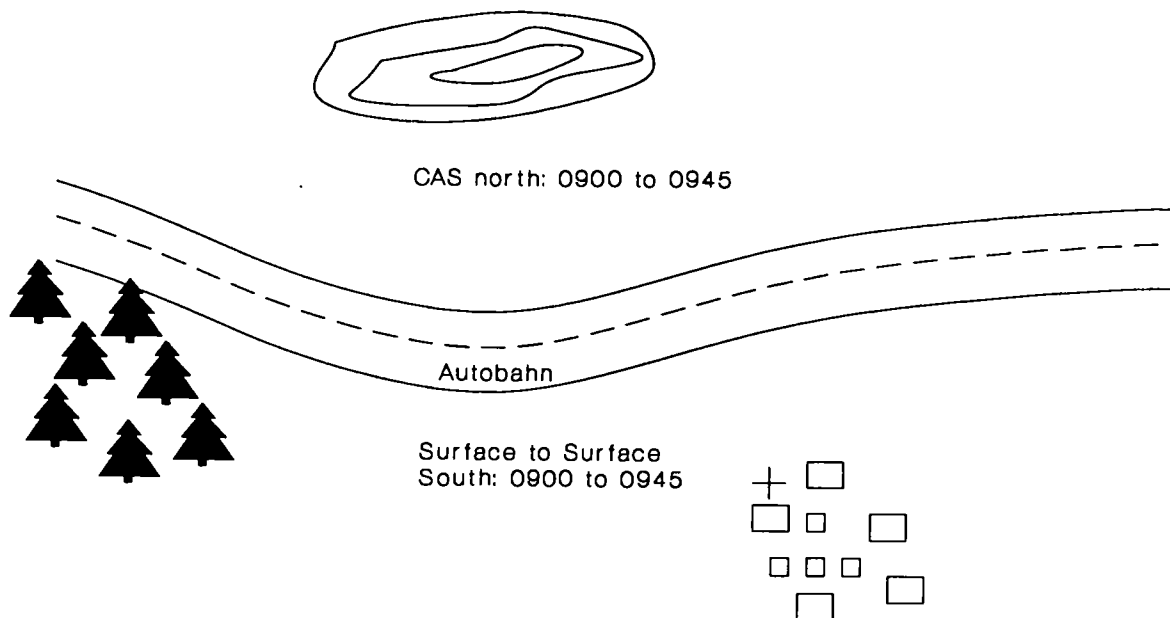


Figure 5-7. Informal airspace coordination area

5-3. INTELLIGENCE

To defeat the enemy, the ATKHB commander must see the battlefield better than his opponent. He must have a superior knowledge of the enemy, weather, and terrain. The commander gains that knowledge from good, all-source intelligence. That intelligence helps him make decisions, issue orders, and employ his forces successfully on the battlefield.

a. The ATKHB commander obtains information about the battlefield from higher headquarters and reconnaissance. The ATKHB submits requests for intelligence through intelligence channels. Once the intelligence requests are filled, the battalion confirms and supplements that data with reconnaissance information.

b. The S2 is the intelligence coordinator for the ATKHB. The S2 gathers, processes, and interprets information from subordinate units. He passes this information to higher headquarters where it is consolidated with intelligence information from other sources and passed to the G2 at division. The G2 disseminates the results as intelligence summaries to provide an intelligence update for units in the division. The S2 also obtains weather information for planning considerations of subordinate units. The S2 and the USAF ALO coordinate the joint suppression of enemy air defense systems.

c. Intelligence collection requirements are distributed in terms of essential elements of information and other intelligence requirements. Based

on the mission, command guidance, and available intelligence, the S2 develops an intelligence course of action based on the needs of the battalion and higher headquarters. If the commander approves the course of action, orders and requests are issued to collect information for intelligence production.

5-4. ENGINEERS

Engineer operations are time- and labor-intensive. They may not be realistic in ATKHB operations because of the shortage of engineer assets and the number of tasks to be performed. However, the ATKHB must take advantage of obstacles and minefields emplaced for other forces on the battlefield. If engineers are made available to an ATKHB, they can assist in numerous ways.

- a. Mobility. Engineers can increase the mobility of an ATKHB by--
 - Constructing LZs, FARPs, and forward aviation maintenance sites.
 - Constructing combat roads into and out of assembly areas and FARPs.
 - Clearing rubble for the passage of vehicles and aircraft (ground handling) in built-up areas.
 - Removing trees and other obstacles to flight along attack routes to keep aircraft from being silhouetted.
- b. Counter mobility. Engineers increase capabilities of an ATKHB by--
 - Emplacing minefields to fix or turn enemy vehicles.
 - Constructing other obstacles in engagement areas that delay, disrupt, turn, or block the enemy.
- c. Survivability. Engineers can increase the survivability of the ATKHB by--
 - Preparing buildings to house aircraft and equipment.
 - Constructing protective positions for aircraft in the assembly area.
 - Constructing protective positions for fuel and ammunition vehicles in FARPs.

5-5. JOINT AIR ATTACK TEAM

Combat support need not only come from Army combat support elements but may also come from joint and combined assets. The most prevalent of these relationships is that of TACAIR, field artillery, and the ATKHB which forms a joint air attack team. A JAAT operation is a synchronized, simultaneous attack by attack helicopters, close air support, and field artillery against an enemy force. The attack may be against a single enemy element or against several enemy elements within a specified area. An ATKHB is frequently called upon to form a JAAT while conducting its assigned missions. For an

ATKHB, a JAAT is nothing more than a normal mission with the additional combat support of CAS. The addition of CAS gives both the ATKHB and CAS team greater survivability while it increases their firepower and complicates the enemy's countering attack. The JAAT may operate either as an integrated member of the combined arms team that reinforces ground maneuver units or as an independent force. In either case, the JAAT is used to support the commander's ground maneuver plan throughout the battlefield.

a. Composition. The composition of the joint air attack team is discussed in the paragraphs that follow.

(1) The commander. The commander (normally brigade or higher) is responsible for the ground and airspace below the coordinating altitude where JAAT operations take place. The commander must synchronize the JAAT into the battle and bring its combined fires into play at the decisive moment. The commander uses the JAAT to attack similar targets that he would use the ATKHB to attack. The JAAT, however, has greater combat power; therefore, it can overwhelm an enemy force or attack a larger enemy force. To plan and coordinate the JAAT, the force commander uses his S3, TACP, FSO, and the ATKHB commander or his liaison officer.

(2) Attack helicopters. The attack helicopter portion of the JAAT consists of ATKHB aircraft. Except for the additional planning and coordination necessary for a joint operation, the ATKHB will conduct the JAAT operation as they would a normal mission. During the JAAT operation, the ATKHB will plan the operation, coordinate the attacks in the engagement area, and provide SEAD for attacking CAS aircraft and attack helicopters. Although the ATKHB will provide suppressive fires against enemy AD, the primary armor killers are ATKHB aircraft. The size of the JAAT depends upon the ATKHB commander's analysis of the factors of METT-T and the number of CAS sorties allocated. The JAAT may be composed of one ATKHC with two sorties of CAS, the entire ATKHB with only one ATKHC attacking with CAS, or any number of other combinations.

(3) TACAIR. TACAIR consists of tactical aircraft capable of performing close air support. Primarily, these aircraft are the US Air Force A-7, A-10, F-4, and F-16; US Navy F-6, A-7, and FA-18; and US Marine Corps AV-8 and FA-18, although other tactical aircraft may be employed. JAATs will normally be formed with US Air Force participants. However, US Navy and US Marine Corps assets may be available in some cases. The use of TACAIR significantly increases the combat power of the ATKHB or ATKHC by virtue of the large and varied ordnance payloads available.

(a) The Air Force A-10 provides the most flexible support to JAATs and has several advantages over other tactical aircraft. A-10s were specifically designed and dedicated to the CAS mission, their pilots have trained extensively with Army units in JAAT employment, and their communications are compatible. The A-10 has extensive loiter and multipass capabilities and can react quickly to a changing attack plan.

(b) Fielding of advanced aircraft, such as the AH-64 and OH-58D, along with other factors such as current and projected improvements

in enemy air defenses, has caused the Air Force and Army to consider the employment of faster, more survivable TACAIR assets in JAAT missions. TACAIR assets will not normally possess either the extended loiter capability or the capability to visually acquire targets unaided as well as A-10 pilots and aircraft. However, advanced avionics and munitions enable A-16 pilots to work effectively with advanced helicopter crews to destroy enemy armor formations safely and effectively. The use of aircraft other than A-10s may require more coordination between the FAC and the ATKHC commander.

(4) Forward air controller. The FAC may be an ALO assigned to the supported echelon TACP or an airborne FAC operating in a fixed-wing aircraft outside of the enemy air defense envelop to coordinate and control TACAIR in the JAAT. In the absence of a FAC for the operation, the ATKHC commander may coordinate directly with TACAIR; the TACAIR flight leader will control employment of the fighter aircraft. Ideal coordination is best achieved with the FAC/ALO located in an aeroscout aircraft.

(5) JAAT fire support.

(a) Indirect fire support is an important part of the JAAT. Fire support is normally used to begin the attack, suppress or destroy enemy AD, force armored vehicles to "button up" so that their visibility is reduced, and create confusion within the command and control of the element under fire. The JAAT will obtain field artillery support from the field artillery battalion in direct support of the ground maneuver brigade. It will also obtain field artillery support from the general support field artillery unit supporting the forces as a whole when the JAAT is operating for the division or corps.

(b) If the ATKHB does not have an FSO, fire support planning will come from the echelon that plans and coordinates the JAAT. Normally, the direct support FA battalion will provide an FSO. The FSO must work closely with the Air Force TACP located at a ground maneuver brigade, division, or corps headquarters so that fire support will fit smoothly into the plan. Once the JAAT mission begins, the ATKHC commander or aeroscout works directly with the FSO to coordinate continuous fire support. When the ATKHC commander cannot contact the FSO directly, he can--

- Request that an FAAO in an OH-58D be attached to the JAAT organization to act as the FSO.
- Call directly to a field artillery unit that is dedicated to the JAAT mission.
- Use a ground company's FIST team chief to control artillery fires and add ground unit mortar fires if the battalion is conducting operations with a ground force.

b. Mission Planning. Because each member of the JAAT retains his own C² system, mission planning must be a coordinated effort. Constant coordination is required between the ground maneuver commander, aviation commander, TACAIR flight leader/ALO, and FSO. As elements of the mission change, all members

must be informed so that they can adjust their plans accordingly. Success of the JAAT operation depends on the proper synchronization of assets and how well each member of the JAAT understands the operation. JAAT operations may be either preplanned, immediate, or spontaneous.

(1) Preplanned. A preplanned JAAT operation is used when time is available to request TACAIR in the normal planning cycle (usually 36 hours). The preplanned request is drafted by the FSO in coordination with the TACP and processed through Army channels to the TACC at the tactical Air Force headquarters. The TACC then processes the request according to priorities selected by the joint force commander.

(2) Immediate. An immediate request for TACAIR is used when time is not available to process the request within the normal planning cycle. The request is transmitted by the appropriate echelon TACP over the Air Force air request net directly to the ASO collocated at the corps TOC. Intermediate level-TACPs monitor these requests and advise their respective commanders. Intermediate echelon commanders may direct their assigned TACP to disapprove the request using the air request net if other assets are available or they otherwise do not support the request. Silence by intermediate-level TACPs for a specified amount of time (normally 15 minutes) is considered approval. Following approval by the corps FSE, the ASOC coordinates with the TACC to fulfill the requirement for TACAIR.

(3) Spontaneous. A spontaneous JAAT operation occurs when all members of the team are available but no time is available to plan and coordinate. To be successful, spontaneous JAAT operations depend on unit SOPs, training, and communications. A successful JAAT operation is possible anytime pilots are able to coordinate actions by talking with each other. A common JAAT frequency that can be used by the team members is a critical portion of a spontaneous JAAT operation and should be included in CEOIs and Air Force ATOs. A common JAAT frequency will allow the ATKHC to communicate and coordinate its attacks with the CAS in a minimal amount of time.

c. Employment. Employment of the JAAT depends on the factors of METT-T. The method of employment is decided as early as possible so that attacking assets can be coordinated. The two basic employment methods are sector attacks, which allow each element of the JAAT to attack within a specified sector, and combined attacks, which occur when JAAT elements mass their fires by attacking in the same sector.

(1) Sector attacks. The three types of sector attacks are sector-simultaneous, sector-sequential, and sector-random.

(a) Sector-simultaneous. During sector-simultaneous attacks, each element maneuvers to attack within its assigned sector in order to engage targets simultaneously with other JAAT elements. All aircraft must coordinate ordnance fans to avoid fratricide.

(b) Sector-sequential. During sector-sequential attacks, each element maneuvers to attack within its assigned sector in order to attack in a predetermined sequence. This sequence may range from several seconds to

several minutes. This option reduces the ordnance fan coordination problem and facilitates covering fire for each preceding element.

(c) Sector-random. During sector-random attacks, each element maneuvers to attack within its assigned sector and engages targets at will. All elements must coordinate ordnance fans and ensure fragmentation avoidance.

(2) Combined attacks. The three types of combined attacks are combined-simultaneous, combined-sequential, and combined-random.

(a) Combined-simultaneous. During combined-simultaneous attacks, all elements engage targets in the same sector and attack simultaneously. All elements must coordinate ordnance fans and ensure fragmentation avoidance.

(b) Combined-sequential. During combined-sequential attacks, all elements engage targets in the same sector and attack in a predetermined sequence. This sequence may range from several seconds to several minutes. This option reduces the ordnance fan coordination problem and facilitates covering fire for each preceding element.

(c) Combined-random. During combined-random attacks, all elements engage targets in the same sector and attack at will. Once again, all elements must coordinate ordnance fans and ensure fragmentation avoidance because attacks may inadvertently be simultaneous.

d. Conduct of Operations. After receiving the mission, the ATKHB will conduct mission analysis in as much detail as time allows. All planning, coordinating, analyzing, and rehearsing are conducted to ensure success.

(1) Upon departing the holding area, aeroscouts move forward to reconnoiter the target area. Aeroscouts verify battle positions, avenues of approach, obstacles, and potential engagement areas that have not been already identified. If the enemy has already entered the engagement areas, aeroscouts maintain contact and attempt to locate its air defense systems.

(2) Aeroscouts should initiate indirect fire support during reconnaissance and continue throughout the mission. Typical artillery support for a JAAT operation may begin with an initial engagement of the enemy at extended ranges to slow its movement and force armored vehicles to "button-up." Artillery fire is continued throughout the attack to suppress air defense assets, separate enemy elements, and create confusion.

(3) ATKHC aircraft should occupy the battle positions about the same time that the artillery engagement begins. Their arrival should also coincide with the arrival of the CAS at the IP. This is the most difficult part of a JAAT operation. The aviation commander must attempt to flow all the assets into the battle in various combinations without piecemealing the force. As the ATKHC arrives in the battle position, the platoons take up their positions and begin their attack according to the commander's scheme of maneuver. A portion of the ATKHC will most likely begin the attack by

engaging air defense targets identified by the aeroscouts during their reconnaissance. The platoon (or the number of aircraft) that is assigned to SEAD and security is determined by the local threat. The remainder of the company attacks in sector according to company attack priorities.

(4) When the CAS flight leader arrives in the battle area, he contacts the ALO. He gives the ALO his call sign, mission number, available ordnance, and loiter time. The ALO or the ATKHC commander, if the ALO is not available, passes the target information to the CAS flight leader. The ATKHC commander, the ALO, and the CAS flight leader must have good communications. The ALO should be with the ATKHC commander and have face-to-face communications during the mission. If the ALO is not in direct contact with the ATKHC commander and cannot communicate quickly with both the ATKHC commander and the CAS flight leader, he should hand over the CAS flight to the ATKHC commander and allow him to control the CAS.

(5) CAS aircraft usually enter the target area in a flight of two. The flight leaves the IP using low-altitude tactical navigation, which maximizes terrain-masking. The flight leader contacts the ALO or the ATKHC commander for an update on friendly and enemy activities. In addition to receiving an update on the situation, the CAS leader should also give an inbound call. This call is expressed in units of time; for example, 30 seconds. The ATKHC commander uses this call to shift fires and coordinate the battle.

(6) As CAS aircraft attack, the ATKHC commander observes their attack. Then directly or through the ALO, the ATKHC commander adjusts the CAS attack by using cardinal headings and distances from the last point of attack. If the ATKHC and CAS aircraft are equipped with lasers and laser-detection devices, the attack helicopters can mark targets, the center mass of the target array, and boundaries of the sector or designate targets for Air Force-delivered, laser-guided precision munitions. The use of lasers increases the speed and security of the attack and reduces the amount of communications necessary between the ATKHC and the CAS flight.

e. Communications. The communications link between members of the JAAT is critical. The ATKHC and the TACP must coordinate the frequencies to be used before CAS aircraft arrive at the IP.

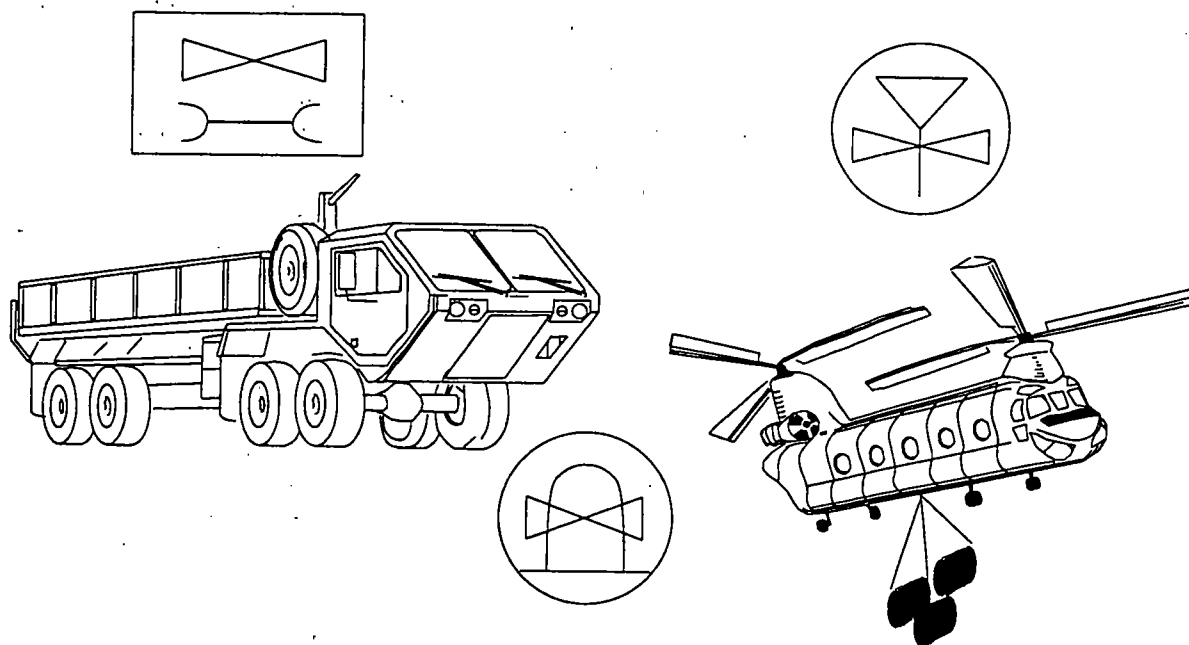
f. AH-64 Equipped JAAT. The AH-64 gives the JAAT additional capabilities, as discussed below.

(1) Communications. Communications are the key to effective JAAT operations. The Have Quick radio system on the AH-64 and Air Force CAS aircraft allow jam-free, secure communications with ALO and CAS elements. The AH-64 laser designator can mark sectors, targets, and enemy positions for CAS aircraft equipped with proper sensing devices.

(2) Laser-guided bomb. The LGB offers improved effects on the targeted enemy force. Laser-guided munitions can destroy bridges and other attack priority targets while allowing CAS aircraft greater survivability.

Chapter 6

COMBAT SERVICE SUPPORT



Successful ATKHB operations will depend on close staff coordination. The battalion staff must anticipate and coordinate ATKHB CSS with higher echelon CSS. Under the direction of the battalion XO, the S1 and S4 coordinate supply, maintenance, personnel service support, and health service activities to support combat operations. The ATKHB depends on CSS from its parent aviation brigade, the DISCOM, and the COSCOM. The principles and doctrine for CSS planning are described in general terms in FM 100-10. Corps and division CSS doctrine is contained in FM 63-3J and the FM 63-2 series manuals.

6-1. PLANNING AND COORDINATION

a. Planning. Combat operations and CSS planning must be conducted at the same time. The ATKHB commander relies on the S3 to employ his unit and the S4 to support it. Successful ATKHB combat operations require timely reports that reflect the CSS status of the battalion. Unlike other maneuver forces, the ATKHB will be tactically employed anywhere within the division's or corps' area of operations. The aviation brigade supporting the ATKHBs also shares the same area. However, the aviation brigade is employed without an FSB. Tactical and CSS planning must include support packages for aviation units throughout the division/corps sector. The DISCOM/COSCOM unit or units supporting a ground maneuver brigade FSB and the division main support area must be prepared to support the ATKHB. To ensure the availability of CSS, the DISCOM/COSCOM, aviation brigade, and ATKHB commanders must maintain close coordination.

b. Coordination. Depending on the environment and the mission, attack helicopters will require fuel and ammunition resupply every 1 1/2 to 2 hours. The battalion staff must forecast support requirements based on the expected duration of the mission. Requirements are processed through the brigade staff and then sent to the DISCOM/COSCOM. The DISCOM/COSCOM staff directs support to the ATKHB from the appropriate DISCOM/COSCOM unit. Successful ATKHB missions will depend on how well Classes III and V and aircraft maintenance, recovery, and evacuation are integrated into the tactical plan.

6-2. ORGANIZATION AND COMMAND AND CONTROL

a. Organization. Combat service support for the ATKHB is usually organized in echelons. Combat trains are located where they can best support the operation and consist of FARPs, maintenance support teams, medical specialists, and the TOC. The remainder of the battalion CSS assets, which are field trains, will be with the battalion rear CP in the division main support area.

b. Command and Control. The XO is responsible for CSS command and control. He operates from the battalion TOC. The S1 and S4 forecast CSS requirements and request the appropriate support from the brigade staff. The brigade staff processes the requests for support and coordinates the requests with appropriate divisional assets. The battalion will enter the aviation brigade's administrative and logistics FM and AM MSE nets. Figure 6-1 shows a typical CSS communications net.

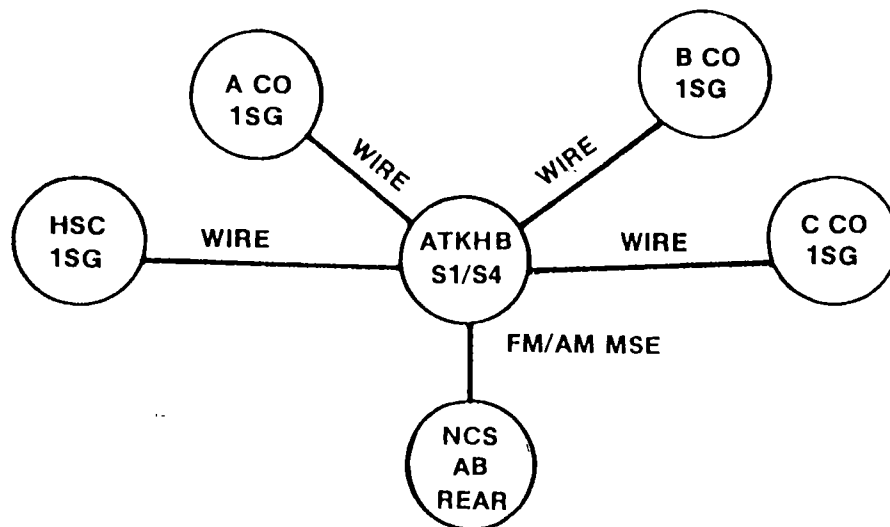


Figure 6-1. CSS communications net

6-3. FUEL AND AMMUNITION

Fuel (Class IIIA) and ammunition (Class VA) are two of the three classes of critical supplies. The third class of critical supplies is repair parts (Class IXA), which is discussed in paragraph 6-6.

a. Fuel.

(1) Requests. Periodic status reports on bulk POL products are initiated by the S4. They are processed through the aviation brigade S4 who consolidates user needs and coordinates delivery through the DMMC. When possible, corps tanker assets will throughput bulk Class IIIA to the combat trains or to the closest support battalion fuel distribution point. If an emergency fuel shortage arises, attack unit tankers or aircraft can go to the division airfield where the MSB maintains up to one day's supply of Class IIIA. Corps cargo and utility aircraft may also be available to provide limited aerial resupply of Class IIIA from corps sources, or divisional CAC aircraft can cross-level fuel in 500-gallon drums from within the aviation brigade. Figure 6-2 shows Class IIIA being delivered.

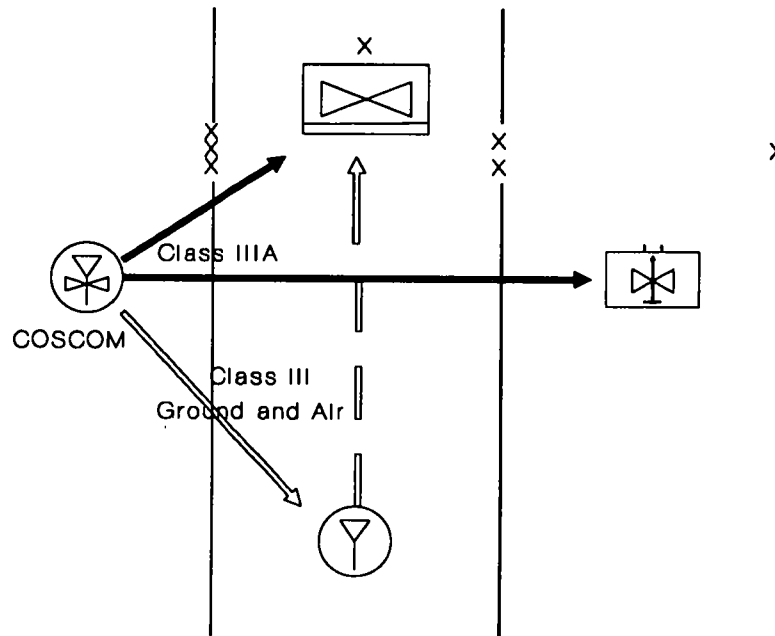


Figure 6-2. Class IIIA supply routes

(2) Requirements calculations.

(a) Class IIIA requirements are determined based on both daily and mission needs. Daily needs are determined by multiplying the estimated daily hours each type of aircraft will fly by the consumption rate of the aircraft. That figure is then multiplied by the total number of that type of aircraft in the unit. The consolidated fuel total of the attack, scout,

and utility aircraft in the battalion is the daily fuel quantity that must be requisitioned.

(b) Mission needs are determined by applying the same formula used to calculate daily needs. However, mission-available aircraft totals are used instead of organic totals, and mission hours are substituted for daily hours. Totals may be adjusted based on the fuel that is already in the aircraft when the mission begins. This calculation gives the correct amount of fuel needed at the FARP to support a given mission.

(c) Fuel consumption rates for calculating daily and mission needs of an ATKHB are shown in Table 6-1. For example, the mission for a task-organized ATKHB is expected to last 2 flight hours. Fifteen AH-64s, nine OH-58Cs, and two UH-60s will participate. The minimum fuel required for the mission is calculated as follows: 2 hours x 142 gph x 15 AH-64s = 4,260 gallons, 2 hours x 40 gph x 9 OH-58Cs = 720 gallons, and 2 hours x 142 gph x 2 UH-60s = 568 gallons. Combining these quantities shows that a minimum of 5,548 gallons of JP4 is required for the mission.

Table 6-1. Aircraft fuel consumption rates	
Aircraft	Fuel Consumption (gph)
AH-64	142
AH-1	123
UH-60	142
UH-1	106
OH-58C	40
OH-58D	43

b. Ammunition.

(1) High-density ammunition is issued from the ATPs to the ATKHBs as combat-configured loads. ATKHBs receive 100 percent of their ammunition requirements at the ATPs. When it is issued, the ammunition may be reconfigured by the ATKHB into appropriate logistic packages for movement forward and distribution to Class III/V resupply points and FARPs. Figure 6-3 shows the flow of ammunition to the ATP.

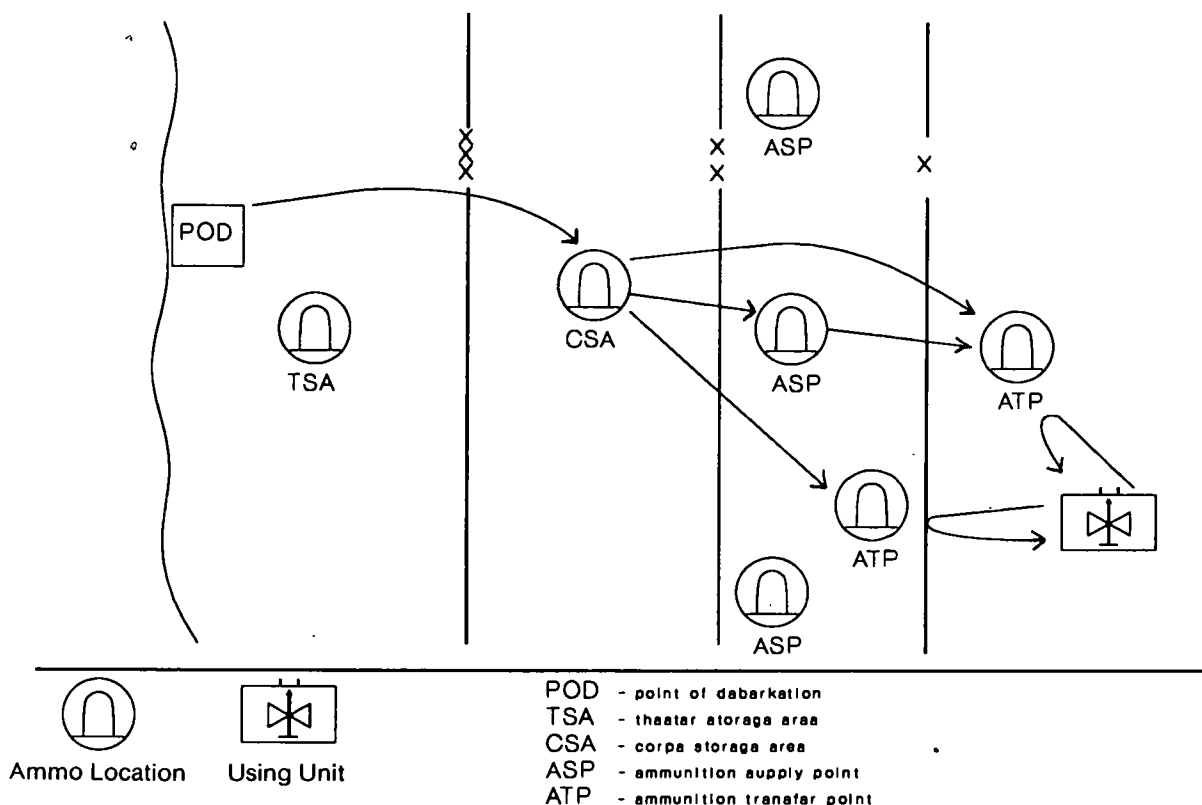


Figure 6-3. Flow of ammunition

(2) Class V requirements are initiated by the battalion S4, consolidated by the brigade S4, and transmitted to the DAO in the DMMC. The DAO ensures that requirements are within the division's controlled supply rate and submits them to the corps MMC. The DAO designates the ATP where division and corps units not assigned or attached to brigades receive ammunition support. The DAO then coordinates with the corps MMC for the required or authorized ammunition to be shipped to the designated ATP for issue to the using unit. In some situations, the DAO may designate an ASP rather than an ATP to provide more responsive ammunition resupply to units operating in the division rear. The DAO informs the brigade S4 at which ATP or ASP the ammunition will arrive and the time it is expected. This data is then passed to the ATKHB S4 who completes DA Form 581 for use by the Class III/V platoon. Class V personnel take the DA Form 581 to the ATP or ASP. There the DAO or his representative authenticates the form, and the Class V personnel draw the required ammunition.

(3) The need to rapidly rearm units that have exhausted all or most of their basic load ammunition may frequently require resupply from an ASP using sling-load operations to the combat trains or FARPs. Cross-leveling Class V supplies within the aviation brigade may also be necessary to relieve emergency shortages.

6-4. TRANSPORTATION REQUIREMENTS

Attack helicopter operations are time-critical. A delay in the arrival of supplies could jeopardize the entire mission. To prevent a delay, the battalion staff must forecast the assets needed to support the mission.

a. Fuel. Fuel transportation requirements for a mission are determined by subtracting the total fuel in mission aircraft fuel cells from the total fuel required to complete the mission. As shown in paragraph 6-3a(2)(c), the ATKHB needs 5,548 gallons of JP4 to accomplish a 2-hour mission with the available aircraft. If three such missions are to be flown, the fuel requirement is 16,644 gallons. By subtracting available aircraft fuel cell totals from this figure, the minimum fuel required at the FARP is 9,345 gallons. The total fuel already on board aircraft is 7,299 gallons. By comparing these figures to the capacity of available fuel trucks, the total number of trucks required can be calculated. Therefore, four HEMTT tankers (10,000 gallons) or six 5-ton trucks with trailer-mounted pods and tank and pump units (10,800 gallons) are required to support the mission.

b. Ammunition.

(1) The first step in forecasting ammunition transportation requirements is to determine how much ammunition must be moved. The next step is to identify the number of vehicles that are required to move the ammunition. Table 6-2 shows the cargo-carrying capabilities of 5-ton and HEMTT cargo trucks.

Table 6-2. ATKHB transport capability (Class VA)		
Ammunition	5-Ton Truck	HEMTT Cargo Truck
Hellfire	45	45
TOW	96	84
70-mm rocket	300	240
20-mm	9,600	19,200
30-mm	10,560	18,400
Stinger	54	54

(2) As an example, the ATKHB is expected to fire 570 70-millimeter rockets during a mission. If the ATKHB is equipped with HEMTTs, three cargo trucks will be required; if the ATKHB is equipped with 5-ton trucks, two trucks will be required. The total transportation requirement will equal the sum of the vehicles required to carry each type of ammunition. Ammunition shortfalls must be identified early so that the ATKHB can pre-position

supplies or request cargo support to ensure a steady flow of ammunition during the mission.

6-5. FORWARD ARMING AND REFUELING POINTS

Forward arming and refueling points are the primary means of supplying the ATKHB when it is employed forward. They allow the commander to position fuel and ammunition forward to support his unit. The battlefield is nonlinear and constantly changing. Each FARP must be austere, transitory in nature, and established to support specific mission objectives. Once committed, the FARP must be able to meet the Class III and V needs of mission aircraft. It also must be large enough to rearm and refuel three scout and five attack helicopters simultaneously. The sole function of the FARP is to provide the commander with the means to reduce turnaround times. The staying time of the ATKHB is increased in proportion to the decrease in turnaround time for Class III and V supplies. Reducing turnaround time enables the commander to apply continuous pressure on the enemy.

a. Planning. The volume of fuel and ammunition required to sustain an ATKHB during a mission requires extensive planning and coordination. Planning for FARP operations must begin early in the planning sequence and provide for continuous rearming and refueling support. During the mission analysis phase, the ATKHB staff must decide if FARP operations are required to accomplish the mission. If the staff determines that FARP operations are required, several key planning considerations are necessary.

(1) Location. The FARP must be located as close to the area of operations as possible. To protect it from enemy medium-range artillery, the FARP is usually positioned 18 to 25 kilometers behind the FLOT or FEBA.

(2) Size. Dispersion of aircraft within the FARP must be planned. Rearming and refueling points allow for aircraft dispersion so that a less lucrative target is presented. Holding areas are planned near the FARP to allow space for spillover aircraft during peak operations.

(3) Security. FARP locations and routes should be masked from radar detection, and consideration must be given to local security. If possible, FARP personnel should coordinate security with ground forces. Ground forces from units located in the ground maneuver BSA may also be dedicated to FARP security.

(4) Resupply. Most FARPs are established to support operations near the FLOT and resupplied by the ATKHB. Traffic volume and road conditions will directly influence the time required to move supplies and equipment into the FARP. If time is short or adequate road access to the FARP is not available, aerial resupply may be considered. In some cases, a combination of aerial and ground resupply may be required.

(5) Beyond the FLOT. At times, operations will be conducted in areas beyond normal logistical support such as beyond the FLOT. When this happens, aerial resupply will be the only means available to sustain

operations. Medium-lift cargo helicopters (CH-47s) and utility helicopters (UH-60s) from the corps and division can be used to support these operations.

b. Personnel. FARPs are designated, established, and manned by members of the Class III and V platoon in the battalion HHC. They are augmented by maintenance contact teams from the AVUM company. Figure 6-4 shows an example of personnel and equipment in these two sections. Light division ATKHBs do not have organic Class III/V platoons. These assets are consolidated in the HHC of the aviation brigade.

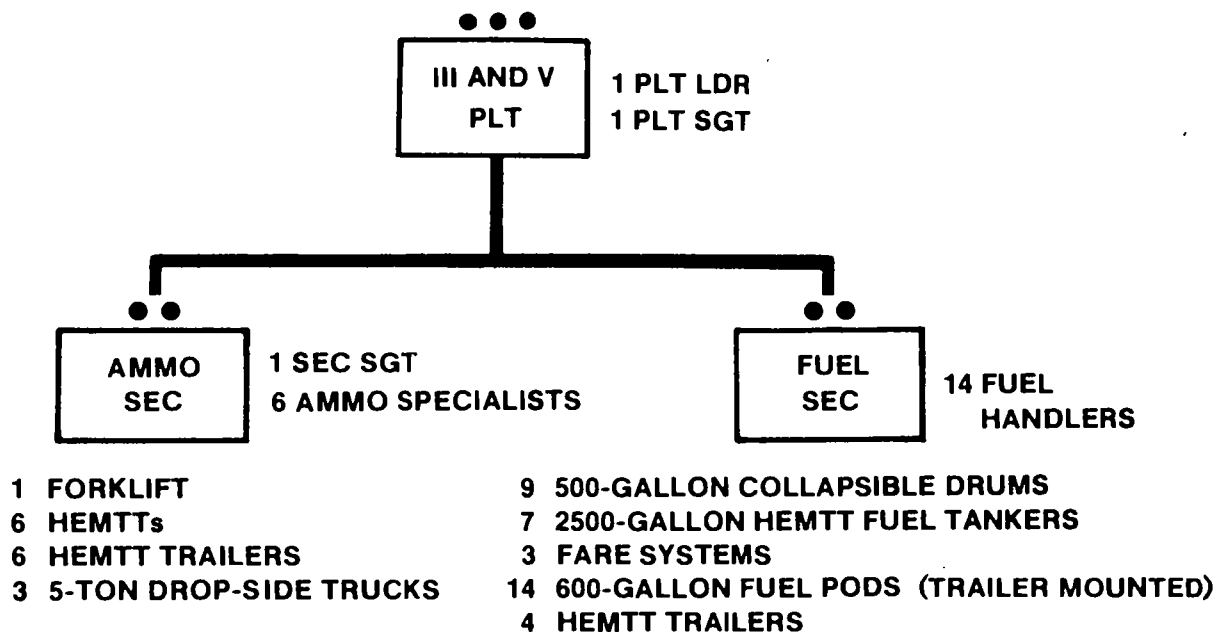


Figure 6-4. Example of personnel and equipment for Class III and V supply

c. Operations. After a FARP site is selected, ground vehicles can transport preloaded supplies. Forward arming and refueling points must be rapidly set up, taken down, loaded, and moved; therefore, personnel must be trained until they are highly proficient. They must be able to relocate and establish the FARP, control aircraft operations, and rearm and refuel aircraft. Maintenance personnel must be able to perform minor aircraft repairs. FM 1-104 describes FARP operations in detail.

d. Continuous Support. The Class III/V platoon enables the ATKHB commander to support multiple FARP operations, and the ATKHB can operate several FARPs in support of the ATKHCs. Each FARP may consist of a HEMTT cargo truck with trailer and two HEMTT tankers with trailers. The FARP will rotate in much the same way as an ATKHC when it is employed using the continuous attack method. This ensures that one or two FARPs will be in place, one will be moving, and one will be in reserve in the battalion assembly

area. This rotation facilitates orderly Class III/V resupply and supports the mission of the battalion.

6-6. MAINTENANCE AND RECOVERY

Like fuel and ammunition, repair parts are critical to combat operations. AVUM and AVIM companies are normally located far enough to the rear of the division or corps so that step-up light sets can be used to facilitate 24-hour maintenance operations. The location of these companies should facilitate coordination and the receipt of logistical support from other agencies in the theater. When equipment cannot be repaired on site, it is moved only as far as necessary to effect repair.

a. Aviation Unit Maintenance. To repair and return aircraft to a serviceable condition rapidly, the AVUM company performs unit-level maintenance actions such as repairs by replacement, minor repairs, and adjustments. AVUM is governed by maintenance allocation charts and limited by ground support equipment, facilities, and the number and skills of available maintenance personnel. The most critical area of unit maintenance is crew chief support of the aircraft. The crew chief is the only maintenance person who has daily contact with the aircraft. Preventive maintenance and fault detection originate with the crew chief.

(1) Personnel. Aircraft maintenance support personnel in the ATKHB are located in the AVUM company. Figure 6-5 shows how the AVUM company is organized.

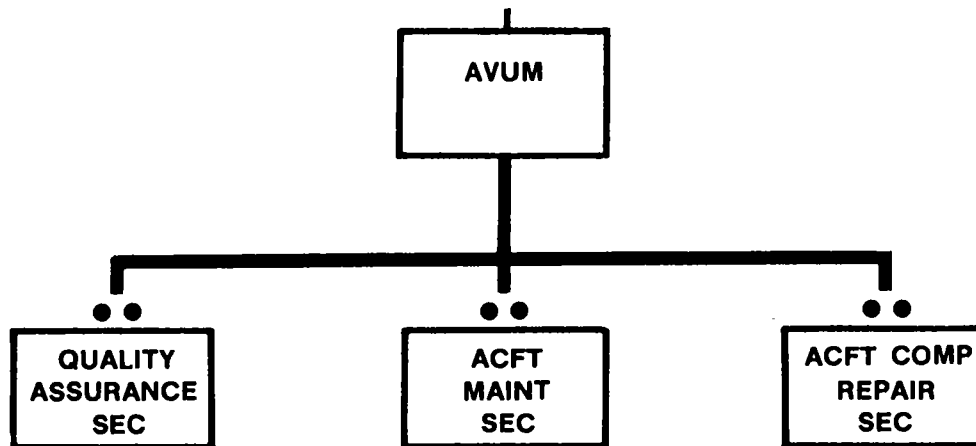


Figure 6-5. AVUM company organization

(2) Responsibilities. The AVUM company conducts preventive maintenance, repair, and parts replacement. It also identifies causes of malfunctions and evacuates unserviceable modules, components, and end items.

b. Aviation Intermediate Maintenance. The divisional AVIM company is a separate company which is organic to the DISCOM and structured to support the specific aircraft assigned to the division. The AVIM company is designed to

provide AVIM-level maintenance and backup support of unit maintenance at its base in the division support area. The AVIM company performs extensive maintenance activities which include structural and airframe repairs, support of the repairable exchange program, and AVIM-level maintenance. The AVIM company also maintains division Class IXA repair parts supply and provides supply support to division aviation units. Nondivisional AVIM companies in the corps and theater areas provide support for their area's aviation assets and backup support for the divisional AVIM companies.

c. Communications Maintenance. The HHC communications section provides unit-level communications maintenance; the AVUM company provides avionics maintenance for ATKHB aircraft.

d. Armament Maintenance. The ATKHB aircraft component repair section performs unit-level armament maintenance. Its capabilities are limited to detection, fault isolation, and evacuation of major components and "black boxes." AVIM armament support is provided at the DISCOM or the COSCOM, depending on whether the ATKHB is a division or a corps unit.

e. Vehicle Maintenance. The HHC maintenance section provides unit-level vehicle maintenance for all ATKHB vehicles. The DS maintenance company of the DISCOM or COSCOM provides vehicle DS maintenance and repair parts support.

f. Recovery.

(1) Aircraft. The AVUM company of the ATKHB conducts aircraft recovery within the limits of its organic capability. The AVUM company should prepare for aircraft recovery contingencies by forming an aircraft recovery team. The aircraft recovery team is composed of personnel and equipment necessary to prepare an aircraft for recovery. Supporting AVUM units provide additional recovery support when recovery is beyond the capabilities of the AVUM company. The decision to recover downed aircraft will depend on the tactical situation and the availability of personnel and equipment necessary to recover the aircraft.

(2) Ground vehicles. The ATKHB recovers and moves its own ground vehicles. When unable to do so, it receives assistance from DS maintenance units.

6-7. PERSONNEL SERVICE SUPPORT

Personnel assigned to the personnel and administrative center perform personnel service support functions. To reduce the administrative burden on the ATKHCs, PAC accomplishes as many support actions as possible. Personnel services support functions fall into two general categories--combat critical and sustainment. Combat-critical functions, such as strength accounting, replacement operations, and casualty reporting, must be performed regardless of combat intensity. On the other hand, sustainment functions can be curtailed or suspended at battalion level during intense combat. During combat or preparation for combat, priority must be given to the combat-critical PSS functions.

a. Combat Critical. To maintain battalion strength, specific actions must be taken. These actions are discussed in the paragraphs that follow.

(1) Personnel accounting and strength reporting. These actions include updating the unit battle roster, which is based on duty positions from the unit TOE and preparing and forwarding the personnel status roster. The personnel status roster is submitted daily and after significant changes in unit strength.

(2) Processing replacements. These actions include assigning replacements based on critical leadership and WSRO assignments. They also include performing administrative and personnel actions such as signing in personnel; preparing SIDPERS transactions; updating battle rosters; and briefing replacements on the tactical situation, unit SOPs, and facility locations.

(3) Casualty reporting. These actions include reviewing casualty feeder reports and witness statements for completeness and accuracy, checking the battalion aid station casualty treatment log to ensure all casualties have been reported, and forwarding the casualty report.

b. Sustainment. To sustain the battalion, PAC must provide personnel services, financial services, and postal services. PAC also provides or coordinates religious support, legal services, morale and welfare services, and public affairs support.

NOTE: Financial support for the battalion is coordinated by the S1 section through the area finance support unit.

(1) Personnel services. These support actions include initiating evaluation reports, SIDPERS transactions, awards and decorations, and promotions or reductions.

(2) Finance services. The degree of financial services given the soldier varies with the tactical situation. In mid- and high-intensity conflicts, regularly established paydays are suspended in the theater of operations. When and where a unit is paid is determined by the unit commander and coordinated with unit finance personnel. The theater commander determines the maximum amount a soldier can be paid. Commanders at brigade or equivalent level (06 or above) may establish an amount that is less than the maximum amount that personnel in their unit who are engaged in a tactical situation would normally receive. FM 14-7 contains more details on finance operations.

(3) Postal services. The corps direct support postal unit provides postal services for the ATKHB assigned to the corps attack helicopter regiment. Postal services for the ATKHB assigned to the divisional combat aviation brigade are provided by the corps direct support postal unit through the division and brigade. In the early stages of a conflict, postal services for soldiers will usually be restricted to personal mail and limited post card and stamp sales. Personal mail must conform to the weight limitations

prescribed by the "free mailing privilege." Normally, postal money orders will not be available in either contingency or prolonged operations.

(4) Religious support. Comprehensive religious support is provided by the unit ministry team of the ATKHR or aviation brigade. The UMT consists of at least one chaplain and one chaplain assistant. Support provided by the UMT includes sacraments, rites, ordinances, and religious services. The UMT provides pastoral care in keeping with the overall mission to nurture the living, care for casualties, and to honor the dead. The UMT advises the command on moral, ethical, and religious issues affecting the unit's mission. Religious support is covered in FM 16-1.

(5) Legal services. These actions include processing UCMJ actions, drafting summaries of violations, and preparing DD Forms 458. They also include processing Article 32 and 15-6 investigations, assembling investigation reports and witness statements, and preparing DA Forms 2627.

(6) Morale and welfare services. These activities include determining the needs and interests of the soldier, obtaining support from agencies, such as the division band, and obtaining recreation-related supplies. They also include providing equal opportunity counseling and drug and alcohol control.

NOTE: Equal opportunity counseling and drug and alcohol control activities will be limited in the field and drastically reduced during combat operations.

(7) Public affairs services. These activities include disseminating information and published material received from higher headquarters and implementing a hometown news release program. The hometown news release program will include preparing, reviewing, and submitting news releases through the local Public Affairs Office.

6-8. HEALTH SERVICE SUPPORT

a. Unit-level health service support elements have the primary mission of preventing illness, providing emergency and routine medical treatment, and medically evacuating the sick, injured, and wounded. Medical personnel are responsible for supervising the training of first aid, buddy aid, and combat lifesaver skills. Additionally, medical personnel provide assistance in preventive medicine measures such as field sanitation and personal hygiene. Limited HSS resources in the battalion require that additional personnel be trained in combat lifesaver skills to assist medical personnel in the initial treatment of casualties.

b. Medical aidmen assigned to the HHC medical section accompany FARP personnel when they move forward; one medical aidman should be stationed at each FARP location. To augment the treatment capability far forward, one of the flight surgeons assigned to the aviation brigade can be attached to the battalion for the duration of the operation. The attachment of the physician completes the battalion treatment team.

c. Provisions for a medical planner must be included in the planning process. The medical planner should consider the--

- Estimated casualty work load.
- Augmentation of medical personnel.
- Preplanned patient collecting points and ambulance exchange points.
- Augmentation of medical evacuation resources by corps level evacuation assets.
- Use of nonmedical transportation assets for the movement of casualties to medical treatment facilities.
- Provision for medical personnel on nonmedical transportation assets to provide en route medical care.



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Appendix A

ATTACK PLANNING AND TERRAIN ANALYSIS

Planning an attack, among other things, consists of selecting engagement areas and battle positions. Through the IPB process, the locations where the enemy will operate are determined. From this information, the ATKHB S3 selects engagement areas that suit the scheme of maneuver of the battalion and the force. Once engagement areas are selected, a determination must be made as to their suitability for an engagement. In addition, decisions must be made about where to engage the enemy and how to fight the battle. This appendix outlines an orderly plan for determining the suitability of engagement areas and battle positions and planning an attack.

A-1. BATTLE POSITIONS

a. A battle position is the position from which attack aircraft will engage the enemy in the engagement area. Its size will vary depending on the number of aircraft that will use the battle position, the size of the engagement area, and the type of terrain.

b. Battle positions are chosen based on factors that improve the survivability of attack aircraft and increase the likelihood of a successful attack. Normally, the battle position is chosen based on a map reconnaissance of the area that surrounds an engagement area and then refined when the commander and aeroscouts arrive. The S3's selection of the initial battle position will normally appear to have the traits outlined in (1) and (2) below. The ATKHC commander takes these positions and further develops them. The selected battle position should be large enough so that the ATKHC has maneuver space. It should also be large enough so that it can be divided into numerous platoon positions. Large battle positions allow the ATKHC commander flexibility to maneuver, positioning the company within range of the enemy and overcoming obscurants. The S3's and ATKHC commander's use of the acronyms NORMA and BRASSCRAF helps them to select battle and firing positions.

c. In FM 1-116, the acronym NORMA is used to select battle positions and the acronym BRASSCRAF is used to select firing positions. While this is a good rule of thumb, NORMA does not provide enough detail to plan the location of the battle position. Therefore, the use of both acronyms (NORMA and BRASSCRAF) will help ensure that the battle position selected will be a good choice. Remember, NORMA and BRASSCRAF provide only the desired traits that battle positions should have. On the battlefield, many of the traits must be disregarded in the selection of battle positions because of the factors of METT-T. Both acronyms are defined in the paragraphs that follow.

(1) NORMA. This acronym is one of two that is used to determine battle and firing positions. It is defined in the paragraphs below.

(a) N--nature of the target. The types of targets and the way the targets present themselves in the engagement area must be determined.

Normally, the targets will be moving, armored vehicles. With this type of target, the ATKHC wants to achieve a positional advantage to attack the enemy's weakest point and gain surprise. To do this, the ATKHC will locate the battle position to the flanks and rear of the enemy force.

(b) O--obstacle clearance. The height of vegetation, terrain, and man-made obstacles in the battle position must be considered when a battle position is selected. High-density altitude makes hovering heavily loaded attack aircraft out-of-ground effect difficult.

(c) R--range to target. For a high P_k , the range from the battle position to the engagement area should be at the optimum range for the weapon system used in the engagement and the enemy target being engaged. If the battle position is 2,000 meters or less from the engagement area, the advantage of the attack helicopter is lessened. Therefore, the ATKHC commander must ensure that other measures are taken to improve the ATKHC's chance of success. Modern tanks and their supporting ADA assets can rapidly acquire and fire at exposed aircraft. Shorter ranges make acquiring and gaining a first round, or burst, easier.

(d) M--multiple firing positions. The battle position should be large enough so that each aircraft has several firing positions.

(e) A--adequate area for proper dispersion between aircraft. Aircraft should not be crowded into small areas, which makes the company more susceptible to enemy artillery fires. The battle position should be large enough for aircraft dispersal and maneuvering.

(2) BRASSCRAF. This acronym is one of two that is used to determine battle and firing positions. It is defined in the paragraphs below.

(a) B--background. The battle position should have a dark background, which allows the attack aircraft to blend in with the terrain. Battle positions without a good background, such as the top of a ridge line or a bare, snow-covered hill behind the battle position, will silhouette the attack aircraft or provide contrast for enemy ADA gunners.

(b) R--range to target. For a high P_k , the range from the battle position to the engagement area should be at the optimum range for the weapon system used in the engagement and the enemy target being engaged. If the battle position is 2,000 meters or less from the engagement area, the advantage of the attack helicopter is lessened. Therefore, the ATKHC commander must ensure that other measures are taken to improve the ATKHC's chance of success. Modern tanks and their supporting ADA assets can rapidly acquire and fire at exposed aircraft. Shorter ranges make acquiring and gaining a first round, or burst, easier.

(c) A--altitude. The altitude of the battle position should be the same or higher than the engagement area. A position above the engagement area allows the attack aircraft a better field of view and the advantage in the engagement. Having the battle position at a higher altitude, however, does not always mean that the engagement area can be seen.

(d) S--sun. Aviators should place themselves so that the sun is to their backs. This puts the glare of the sun in the enemy's eyes, which makes firing with accuracy impossible. The time of day, time of year, and direction to the engagement area from the battle position must be considered when the battle position is selected. If the sun cannot be placed to the back, it should be off to one side--never to the front.

(e) S--shadows. Shadows created by hills, trees, and clouds should envelop the aircraft. Shadows help reduce the reflection of the sun from the canopy and the rotor system from the enemy. Shadows, such as those created by a dark background, make it difficult for the enemy to acquire the position of the aircraft.

(f) C--cover and concealment. Cover is protection from enemy direct fire, and concealment is protection from enemy observation. The battle position should provide cover and concealment for aircraft not firing and concealment for aircraft that are firing. When the aircraft is unmasked to acquire or engage the enemy, much of the cover is lost. However, the aircraft can remain concealed from the enemy when the aviator properly uses dark backgrounds, shadows, and the sun.

(g) R--rotor wash. Whether they are in ground effect or not, attack aircraft produce a large visual signature when they hover over loose leaves, dust, or snow. Snow and dust clouds are visible for great distances and allow the enemy to acquire the aircraft or locate the battle position even before the aircraft unmask. An aircraft flying low and slow over snow-covered trees leaves a cloud and a trail when snow is blown off the trees. This signature can be easily identified from the air and lead enemy close air support to the battle position. Flight modes and routes into and out of the battle position must be carefully considered to compensate for the enemy situation and terrain conditions.

(h) A--adequate maneuver area. The company battle position should be large enough for numerous platoon battle positions. The platoon battle positions should be large enough for numerous firing positions for each aircraft. Aircraft should have enough room to occupy and evacuate the battle position quickly without being exposed to the enemy.

(i) F--fields of fire. As a minimum, targets must be visible to attack aircraft for the acquisition and terminal portions of missile flight. For example, when a TOW missile is fired from an AH-1 for an engagement that is at a range of 3,750 meters, the gunner takes 5 to 8 seconds to select and acquire a target. The time of flight of the missile is 22 seconds. The gunner must be able to see the target long enough to acquire, fire, and maintain visual contact during the last portion of the flight of the missile. Although the target may momentarily be masked from view by terrain or smoke, for the most part, it must be visible to the gunner or the shot is wasted. Even when the Hellfire missile is fired using a delayed lasing technique, the target must be tracked with the laser spot on the target for the last few seconds of the flight of the missile.

A-2. TERRAIN ANALYSIS

Terrain analysis is the process of analyzing an area to determine the effects of natural and man-made features on military operations. Several techniques of terrain analysis are described below. Each allows the ATKHC commander to manually analyze the terrain over which his company will fight. These techniques are labor-intensive and time-consuming. Other techniques, such as digitized terrain using a computer model or photographs of the area of interest, may be available to the commander. A terrain analysis cannot, however, substitute for a physical reconnaissance. On the other hand, a physical reconnaissance is not always possible nor are the resources for computer models and photography always available. The techniques described below will help the ATKHC commander see the battlefield and give him a better idea of the area over which he will fight.

a. The engagement area must be visible from the battle position. The acronym BRASSCRAF was used to discuss the selection of a battle position that is higher than the engagement area, which provides better observation. As previously stated, a battle position that is higher than the engagement area does not ensure that all of the engagement area can be seen or that there are adequate fields of fire in the engagement area. For example, if the battle position altitude is 500 meters and the altitude of the engagement area is 100 meters, common sense indicates that the engagement area should be visible. However, the terrain between the battle position and the engagement area must be considered. If the terrain declines constantly and smoothly from the battle position to the engagement area, the engagement area and all of the terrain between the battle position and the engagement area is visible. Usually, however, the terrain either rolls, falls off steeply, or rises.

b. Changes in elevation can cause dead space within the engagement area and offer the enemy cover and concealment. For example, a battle position is at an altitude of 500 meters, the engagement area is at an altitude of 100 meters, and the target is 2,500 meters from the battle position. A 300-meter ridge is located between the battle position and engagement area. As long as the ridge is located in the first half of the distance to the engagement area, the target is visible. Dead space will exist in the engagement area if the ridge is exactly halfway (1,250 meters) to the target. The 300-meter ridge (1,250 meters from the observation point) creates a dead space 1,250 meters long (Figure A-1). If, however, the battle position is changed to 400 meters, the engagement area is left at 100 meters, and the hill is changed to 150 meters high and located at 2,200 meters, the target must be 20 meters tall to be seen at 2,500 meters. Many different methods can be used to identify dead space in an engagement area. Two of these methods are discussed in the paragraphs that follow.

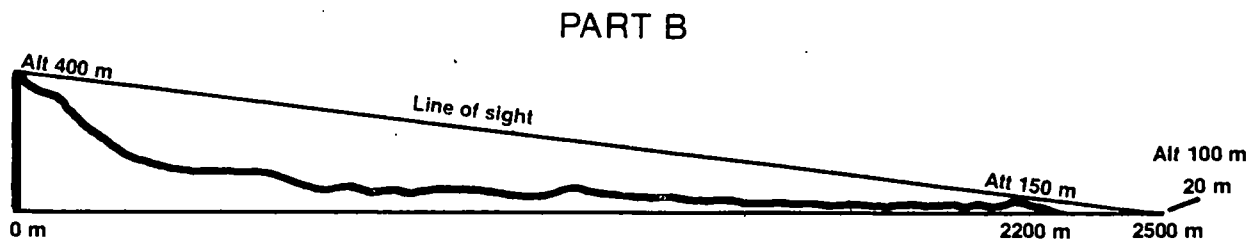
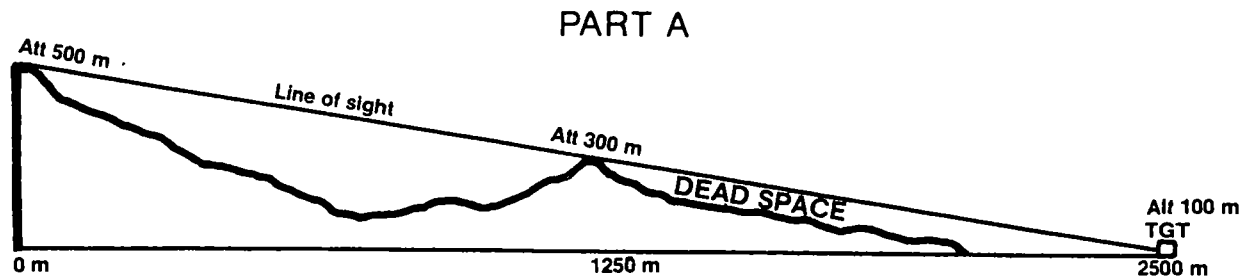


Figure A-1. Line-of-sight examples

(1) Map reconnaissance.

(a) Using the map reconnaissance method, planners can determine dead space by making a detailed map reconnaissance of the battle position, engagement area, and terrain between the battle position and the engagement area. This method provides details on the terrain and altitudes involved. Whenever a rise or fall in the terrain occurs, consideration must be given to how that terrain feature affects visibility between the battle position and engagement area. Any rise followed by a lowering of terrain creates dead space; for example, a small hilltop between the aircraft and the engagement area. Dead space can be marked by a series of hash marks to show the dead space created by the rise or fall in terrain (Figure A-2).

(b) The size of the dead space created by a rise in terrain can be determined by creating a construction, as shown in Part A or Part B of Figure A-1, or by using a mathematical equation. Dead space can be determined by using the formula $X = b[c/(a-b)]$. The letter "X" in the formula equals the size of the dead space from the top of the hill or ridge or from the top of whatever is creating the dead space. The letter "a" equals the height of the aircraft or the battle position over the engagement area (altitude of the aircraft less the altitude of the engagement area). The letter "b" equals the height of the hill or ridge creating the dead space (altitude of the obstacle less the altitude of the engagement area). The letter "c" equals the distance between the aircraft and the obstacle.

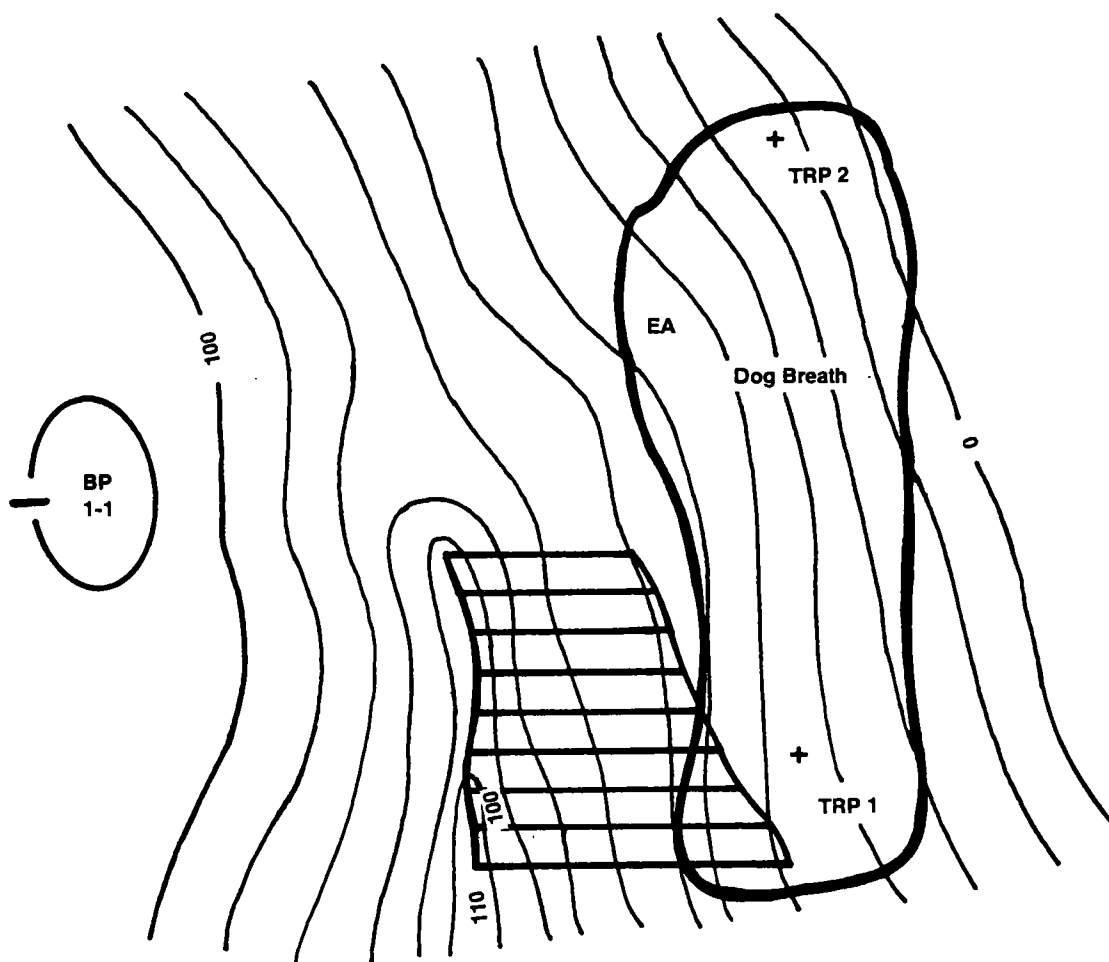


Figure A-2. Sample map reconnaissance

(c) The construction in Part A of Figure A-1 can be used to check the equation. The altitude of the aircraft is equal to the height of the battle position, or 500 meters; the obstacle is a ridge at 300 meters; the altitude of the engagement area is 100 meters. Therefore, "X" equals $(300-100)[1,250/([500-100]-[300-100])]$, which equals $200(1,250/[400-200])$, which equals $200(1,250/200)$, or 1,250 meters. Dead space of 1,250 meters is created by a ridge 300 meters high at 1,250 meters from our battle position. This does not necessarily mean that nothing can be seen in that 1,250 meters but that nothing can be seen at the same altitude of the engagement area (Figure A-3).

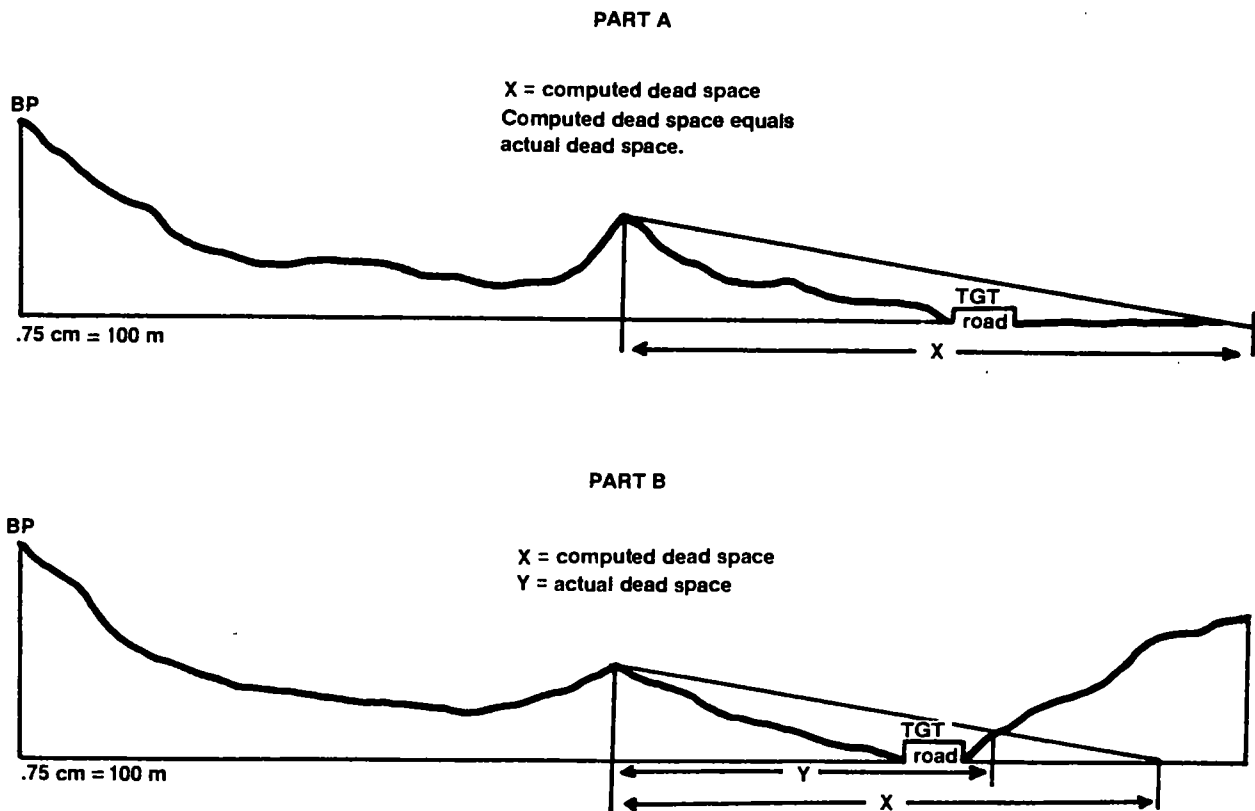


Figure A-3. Construction of dead space

(2) Graphic. Several cards or pieces of paper will be needed to determine dead space using this method. Dead space can be established using the graphic method by selecting the battle position and then evenly placing five firing positions in the battle position. Although firing positions cannot be accurately determined using this method, relative visibility from the battle position can be determined.

- Select the target reference points that will determine the orientation of the battle position and the right and left limits of the ATKHC. (Target reference points may have been given at the same time the battle position was assigned; for example, "Occupy BP Dotson and orient on TRPs 22 and 23.")
- Imagine a straight line that runs from each firing position through the engagement area to the maximum range of the weapon that will be fired.

- Place a mark at each of these imaginary maximum range points.
- Do the same for the far left and right firing positions, but this time use the TRPs as a guide to set the right and left limits of the battle positions.
- Connect all the marks to form the maximum engagement line. (This may be well past the engagement area, but the maximum range points and the maximum engagement line are used only as a reference, as shown in Figure A-4).
- Determine the altitudes of the terrain between the firing position and the maximum engagement line using the cards or paper.
- Record the terrain altitudes between the firing position and the maximum range line starting at either the far left or far right firing position. (This step must be done three times for each firing position--once for the right limit, once for the left limit, and once for the center of the sector.)

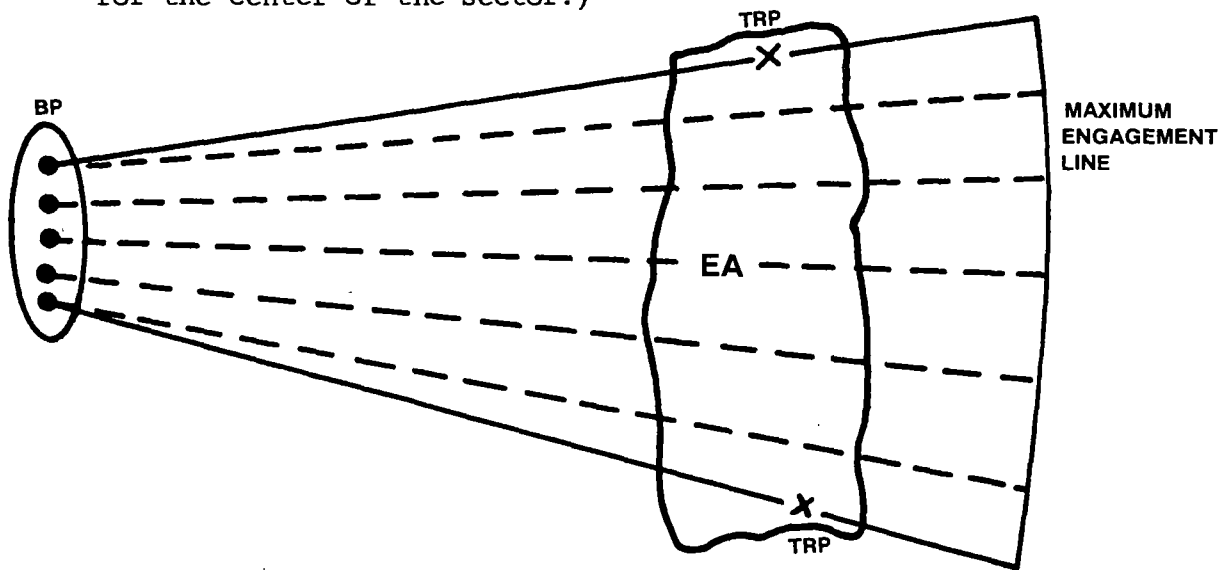


Figure A-4. Maximum engagement line

NOTE: For the following example use the far right firing position.

(a) Altitude/distance card. The altitude/distance card is nothing more than a graphic representation of the different altitudes at a particular distance from the firing position. To prepare the altitude/distance card--

- Place the edge of a card or piece of paper on the firing position and on the maximum range point that marks the right limit for the firing position.

- Mark the location of the firing position and note its altitude.
- Place a mark on the paper each time the edge intersects a contour line (from the firing position to the maximum range point).
- Note the altitude of the contour line each time it is intersected.
- Make three altitude/distance cards for each firing position.

(b) Terrain profile card. Each time a terrain card is completed, a terrain profile must be constructed (Figure A-5). To construct a terrain profile--

- Draw a positive X axis and a positive Y axis on another card. (The Y axis represents altitude, and the X axis represents range or distance, as shown in Part A of Figure A-5.)
- Use the distance index on the map to mark the altitude on the Y axis. (If the firing position is 450 meters, begin at this altitude and work down to the lowest altitude between the firing position and the maximum engagement line.)
- Take the altitude/distance card and lay it on top of the terrain profile card. (The point that marks the firing position is placed on the vertical Y axis at the firing position altitude.)
- Place a mark on the Y axis at the altitude of the firing position.
- Keep the firing position mark on the Y axis.
- Move the terrain card up and down the scale to place marks on the terrain profile card at each altitude that corresponds to a contour line intersection on the altitude/distance card. (A series of marks should result that move outward from the Y axis, parallel to the X axis. Each mark represents the altitude at a particular distance from the firing position, as shown in Part B of Figure A-5).
- Connect all the marks starting at the Y axis and move out along the X axis, as shown in Part C of Figure A-5.

If properly followed, the above instructions should result in a profile view of the terrain between the firing position and the maximum range point. A straightedge helps to determine the line of sight between the firing position and the maximum range point. Dead space is identified when a straight line cannot be drawn from the firing position to a point along the terrain profile without drawing through the profile. Using a straightedge, draw a line from the firing position to the terrain feature's highest point on the profile card to where the straightedge intersects the profile view. The area between the terrain feature and the intersection is dead space, as shown in Part D of Figure A-5.

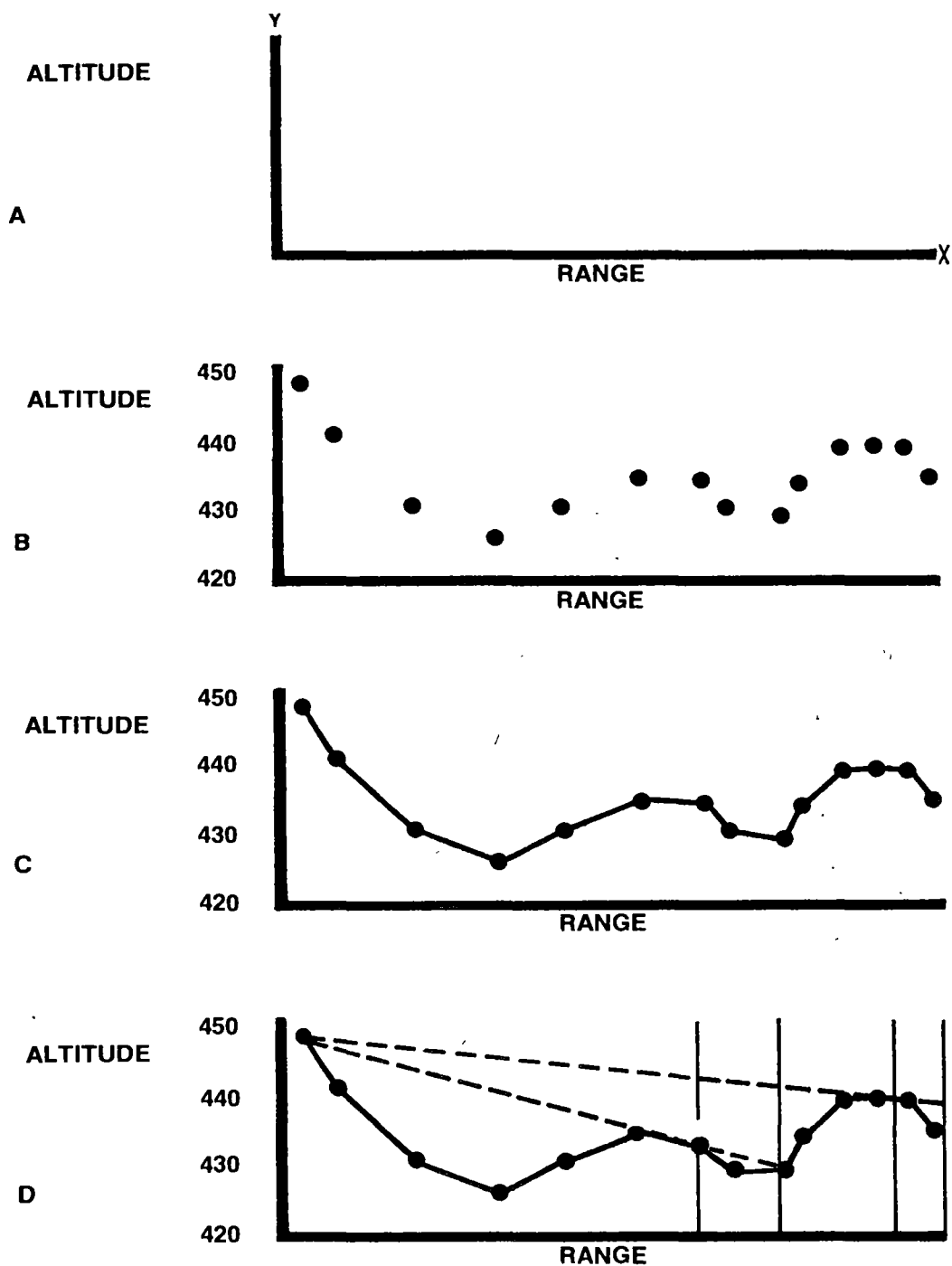


Figure A-5. Construction of terrain profile

c. After the dead space has been marked on the profile card, this information can be transferred to a map. The dead space is transferred to a map by taking the altitude/distance card and transferring the dead space data from the terrain profile card. This data can now be plotted on a map by

laying the altitude/distance card with the noted dead space over the line for which it was produced. When all the firing positions are completed, dead space can be identified between the battle position and the engagement area (Figure A-6).

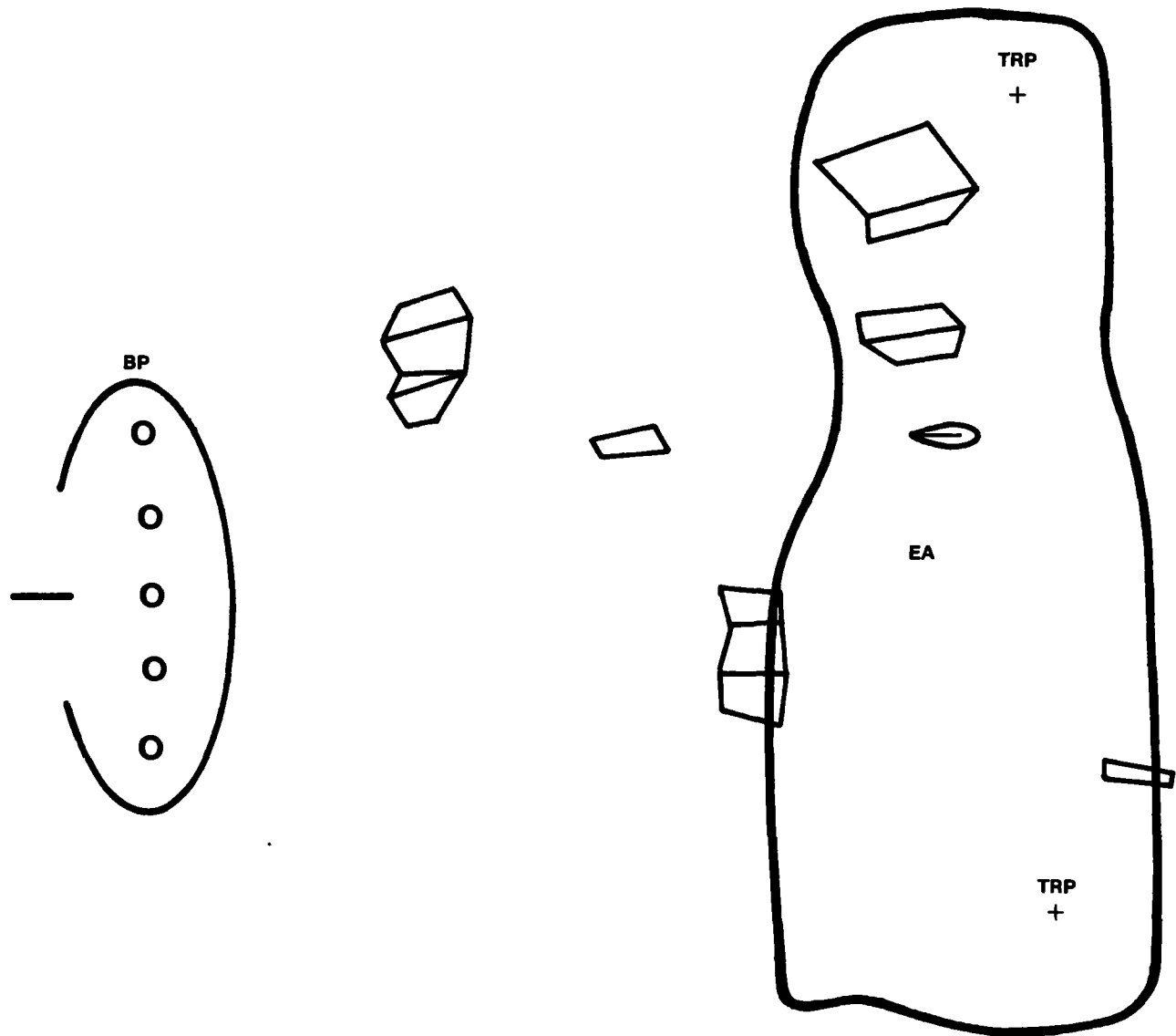


Figure A-6. Dead space

A-3. CONTINUATION PLANNING

After the commander has chosen or been given a battle position to occupy, he will continue to prepare the position. Planning the attack helicopter battle position is similar to planning a ground element (infantry or armor) battle position. An infantry or armor company adds obstacles, formulates fire distribution plans and artillery targets, and prepares firing positions for their vehicles. The commander of an attack helicopter company will probably do all of these things except prepare firing positions. The commander must plan in detail what he has time to accomplish.

a. Avenues of Approach. The commander must consider the avenues of approach in the engagement area and the enemy situation. He must also determine--

- Surface conditions.
- The presence of bridges.
- The slope of the engagement area.
- The deployment of the enemy unit.
- The type of equipment used by the enemy unit.
- The size and type of enemy unit that is expected to be engaged.
- Natural channels that will be used to maneuver through the area.
- Obstacles that engineers have constructed in the engagement area.
- Ways that the enemy may enter and travel through the engagement area.
- Actions that can be taken to restrict enemy movement through the engagement area.
- Enemy armored vehicle traffic that is confined to road travel because of soft terrain.
- Whether artillery and scatterable mines will channelize the enemy or expose its flanks.
- Natural terrain features that will hinder the enemy's advance through the engagement area.
- The location of different types of vehicles in the formation such as air defense, engineer, and infantry-fighting vehicles and tanks.

b. Platoon Battle Positions. The battle position should be large enough so that numerous smaller battle positions can be selected within the larger battle position. These platoon battle positions should incorporate all of the factors previously discussed and allow the commander to cover the entire

engagement area to orient his platoons to the portions of the engagement area that he wants them to cover. When the commander selects platoon battle positions, he must also consider the weapon loads that the aircraft are carrying. For example, the heavy platoon may be heavily loaded with antitank missiles and will cover the portion of the engagement area where the commander expects to find tanks and command vehicles. The light platoon, heavily loaded with rockets and a cannon, can be positioned to cover air avenues of approach or areas in the engagement area where the commander expects the enemy to position ADA assets.

c. Supplementary Battle Positions. If the enemy does not arrive as predicted, supplementary battle positions must be selected. These will allow the company to redeploy its assets to meet the new enemy formation.

d. Battle Position Security. The commander must determine how he is going to clear the battle position before occupation. He must also determine if ground or air avenues of approach into the battle position require screening. For example, the main body of a tank regiment will have flank security 3 to 5 kilometers to each flank. (The company plans to place its battle positions within these ranges.)

e. Battle Position, Engagement Area, and Surrounding Area. Before the battle, the ATKHC commander should reconnoiter the battle position and engagement and surrounding areas, if possible. The commander's reconnaissance should allow him to reconfirm all he has accomplished through the map reconnaissance. The ATKHC should also rehearse on the terrain where the battle will take place. If this is not possible, it can--

- War-game on a map.
- Conduct a walk-through.
- Conduct a sand table exercise.
- Rehearse in an area similar to the actual terrain.

4-4. ELECTRO-OPTIC FORECASTS

Tactical weather teams assigned to corps aviation brigades can provide the ATKHB with FLIR electro-optic forecasts. Using computer technology called "thermal data analysis," user-chosen backgrounds are factored with solar heating, nighttime cooling, elevation, and the day's weather to determine the effects on the temperature of these backgrounds. Using hourly temperature readings, these effects can be depicted in graphic form and the time of IR crossover predicted. IR crossover (when individual backgrounds and target temperatures are the same) renders the FLIR unusable.



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Appendix B

AIR COMBAT OPERATIONS

United States forces must be prepared to counter enemy aircraft in all areas of the battlefield. Threat antihelicopter doctrine, along with friendly helicopter combat effectiveness, has improved. One of the priorities of Threat helicopters will be to destroy US antiarmor systems both in the air and on the ground. The Threat will use fighters, armed helicopters, and all other means to counter US systems. Army aviation units conduct air combat operations as a subset of Army air defense and joint theater counterair efforts in close, deep, and rear operations. They will aggressively conduct air combat to provide protection for members of the combined arms team, to augment air defense, and for self-defense. Offensive and defensive air combat operations are conducted in much the same way as fire and maneuver are executed against targets on the ground. Air combat operations will primarily be conducted within the terrain flight environment and inextricably link Army aviation units to ground maneuver units at all echelons. Attack helicopter battalion commanders and their staffs must ensure that air combat operations are planned to be responsive to the needs and requirements of the local ground maneuver commander according to his intent and scheme of maneuver. By controlling the terrain flight environment, the ground maneuver commander can synchronize his combat activities and employ his assets at the time and place of his choosing. Air combat operations are covered in FM 1-107.

B-1. PLANNING

a. Commanders at all levels and their staffs must assume that air combat operations will be conducted during all types of missions. Deliberate and chance encounters with enemy aircraft will occur throughout the entire battlefield and must be planned for to protect the force. Detailed air combat planning should be conducted down to the lowest level of execution. Specific planning factors and employment techniques are based on the factors of METT-T and may differ depending on where operations are conducted (close, deep, or rear).

(1) Mission. The ATKHB mission and supported maneuver commander's intent are the major factors that determine the extent of the ATKHB's involvement in air combat. The ATKHB and its subordinate companies must not become unduly distracted from their mission by an unexpected air encounter. The ATKHB will protect combined arms elements as necessary, augment local air defense, or provide for self-defense while conducting air combat operations. When the enemy is superior in number, equipment, and ATA weapons, aviation forces dedicated to air combat may be required. These forces may be needed in close and deep operations for main force security. Normally, ATKHB elements will not serve as dedicated counterair forces but will conduct air combat operations as part of the maneuver commander's scheme of maneuver when necessary. All or part of an ATKHB may conduct air combat as a primary mission in support of an offensive or defensive operation. Conversely, the ATKHB and its subordinate ATKHCs conducting attack operations may also be tasked to perform air combat operations in a specific area/time consistent

with the commander's concept of operations and the factors of METT-T. Air combat operations planning will be inherent in any mission planning.

(2) Enemy. Within the terrain flight environment, the primary threat to Army aviation is ground-based air defense (armor, infantry, AD, and SAM) combined with the firepower of helicopters and fixed-wing aircraft directly supporting enemy ground maneuver forces. Threat army aviation forces are air assets that fight in the terrain flight environment. They are integral to the enemy land force commander's concept of operation and are a critical air threat to friendly air and ground maneuver effectiveness. The greater the enemy's capabilities, the greater the combat power that must be dedicated to countering the air threat. Intelligence preparation of the battlefield should identify potential air threats and threat air routes into the area of operations, which is an integral part of the IPB. To begin an air threat analysis, the determination must be made at what point during the mission enemy air contact will occur. Threat-base location and the combat radius of enemy aircraft also help determine the enemy's area of operations and its engagement capability. Difficulty exists in assessing the enemy's employment tactics and intent to engage. Predicting how the enemy will react when it enters contested airspace is difficult, but it is something that must be considered. Consideration should be given to enemy aircraft type, number, weapon systems, and command and control framework. Corresponding tactics must also be considered when possible enemy courses of action are assessed. The enemy's main attack and its commitment of air assets have a direct correlation. Soviet forces will likely commit their attack helicopter regiment in the area of the main effort to coincide with the commitment of their tank regiment of the first echelon division. These helicopters will attack targets not reached by artillery to a depth of 3 to 10 kilometers on the friendly side of the FLOT. Further to the defender's rear, 50 to 60 kilometers, Soviet fixed-wing aircraft will attack nuclear assets, command and control assets, logistical sites, and force reserves.

(3) Terrain and weather. Terrain does not hinder helicopter maneuverability; rather, it provides the helicopter with increased survivability. Effective use of terrain is one of the keys to successful air combat. Predicting how enemy aircraft will approach a target is also a difficult part of the air IPB. The inherent flexibility of the helicopter allows it to avoid the effects of terrain, which makes predicting possible air avenues of approach difficult.

(a) One method that is used to determine a possible air avenue of approach involves analyzing relatively fixed factors. These factors are--

- Size of the enemy element.
- Known or suspected locations of enemy air bases or staging areas.
- Location of friendly critical assets (potential targets for enemy forces).
- Trade-off of fuel versus ordnance carried for the anticipated radius of the operation.

(b) Considering these factors, most Threat aircraft will fly a straight-in approach from the air base to the vicinity of a target; therefore, the approach is normally predictable in the vicinity of the target. This general air avenue of approach allows for shorter overall mission time and maximum ordnance loads. Determination of this straight line aids in identifying air corridors. Deviations from the straight-line air avenue of approach may result because of concentrations of friendly air defense or terrain that forces unwanted exposure of the Threat force. Near the target, most attacking aircraft will fly lower. This allows use of terrain masking to minimize enemy early warning and exposure times to specific targets and associated defense.

(c) An analysis of vegetation and terrain relief will show where terrain masking and adequate maneuver space are available for ATKHB weapon systems. Terrain may alter the selection of battle positions depending on whether air-to-air or air-to-ground engagements are expected. Air-to-ground battle positions are selected primarily for their range, visibility, and cover and concealment with respect to the ground engagement area. Air-to-air battle positions must also provide air-to-air sectors of fire and effective overwatch for the air threat. Further considerations must be given to the impact of weather, the impact of terrain on communications, and visibility throughout the area of operations. Weather affects terrain, equipment, and troops; low visibility degrades all aviation operations. Although some attack aviation has near all-weather capability, low visibility degrades the speed with which operations can be executed and limits acquisition ranges on enemy aircraft. Reduced acquisition range increases the possibility of chance encounters, and low ceilings limit the amount of available maneuver space for air combat maneuvering. Low ceilings, however, also provide concealment from enemy aircraft. Under these environmental conditions, selection of battle positions that provide terrain masking and allow for surveillance of air avenues of approach will be difficult.

(4) Troops available. The troops that are available will determine force ratios that impact on mission planning, organization for combat, and air combat execution by the ATKHC. The types of friendly forces available, such as ADA, CAS, FA, intelligence, air assault, and air cavalry, influence all aspects of mission planning. During the planning and allocation of combat power, maneuver commanders will decide whether to assign a specified air combat mission to the ATKHB under their command and control based on the factors of METT-T. The maneuver commander must make a conscious decision when tasking aviation forces with a primary mission of air combat. This tasking, whether assigned as a primary mission or as a response to contact, reduces the amount of attack helicopter assets available for air-ground operations as part of the scheme of maneuver and the combined arms effort.

(5) Time.

(a) The time that is available determines the detail of planning and coordination for air combat. Time, in terms of responsiveness, will also be important to countering an air threat successfully. Responsiveness of the ATKHB to counter an air threat depends on--

- At what speed and direction the air threat is traveling.
- Where the air threat is picked up by the forward area air defense system.
- The location of ATKHB aircraft, either en route to or while occupying a FARP, holding area, forward assembly area, or battle position.

(b) The time that operations are conducted also has an impact on the conduct of air combat operations. Night operations conducted by the ATKHB enhance survivability and mission accomplishment against a sophisticated air and ground threat.

(6) Other factors. ATKHB and company commanders must consider C³I, armament, fuel, and aircraft survivability in air combat planning. Commanders must make maximum use of communications equipment to ensure positive command and control of their subordinate elements and timely flow of intelligence. When planning for air combat, the ATKHB or ATKHC also needs to obtain information about the location, types of weapon systems, and coverage areas of friendly ADA.

b. ATKHC air combat premission planning will be an inherent part of all ATKHC premission planning. The ATKHC commander will--

- Determine actions on contact and brief them to the entire company.
- Designate air and ground observation sectors to the subordinate platoons.
- Brief the weapons control status portion of the ROE that is received from ATKHB.
- Coordinate with combined arms or joint assets as necessary for updates on rules of engagement, which are normally received from the ATKHB.
- Coordinate with other aviation assets that are conducting concurrent missions in the same area to determine their control measures and actions on contact.

B-2. COORDINATION

When properly coordinated, the synchronized effort of every combined arms element and its supporting assets can overwhelm potential adversaries.

Premission planning should include combined arms coordination to ensure that every available asset works together to defeat the Threat.

a. Air Defense Artillery. Ground air defense retains the primary mission to defend combined arms elements against the air threat. According to the Army tactical C² systems concept, the functional ADA control at corps, division, and brigade level, is the forward area air defense command, control, and intelligence system. The air defense effort is unified by FAAD C²I. It provides for a near real-time digital distribution interface among organic and external sources and FAAD command elements, combined arms elements, and their weapon systems. It alerts, cues, and identifies hostile aircraft. ADA provides tremendous firepower, which may work synergistically with aviation forces conducting air combat, and develops the means to provide C²I to Army units involved in the counterair effort. Aviation brigade and appropriate subordinate commanders (ATKHB and ATKHC) and their staffs must ensure that communication links are established with the ADA air battle management operations center of the division/corps.

b. Armor and Infantry. Armor and infantry units occupy the ground over which air combat may be conducted. The ATKHB coordination of routes, corridors, passage points, battle positions, engagement areas, and fires must be accomplished with combined arms forces in the ATKHB area of operations. This not only maximizes effectiveness of combined arms fires but reduces the tendency for fratricide. Weapons effects of air combat on ground forces should also be minimized where possible. The ground force commander may assign an ATKHB under his control an air combat role and direct it to maintain communications with the ABMOC through the FAAD C²I net. The designated unit's preplanned air engagement areas, rules of engagement, call signs, and frequencies should be disseminated to ground and aviation units operating in the area.

c. Artillery. Artillery coordination by the ATKHB preplans for SEAD targets, suppression of critical air threat nodes, and denial of Threat helicopter standoff firing positions.

d. Close Air Support. TACAIR assets assigned to JAAT or CAS missions are primarily configured with air-to-ground munitions. Most of these assets will also be carrying Sidewinder air-to-air missiles and be equipped with forward 20-millimeter or 30-millimeter cannons, which can be effectively used to assist in countering air threats. Coordination with the FAC or TACAIR flight leader may also allow for diversion of appropriately configured TACAIR assets to assist in destroying the enemy or allowing friendly forces to disengage from the air threat.

B-3. ROLES

The planners of air combat operations must consider offensive and defensive engagements. These two types of engagements are discussed in the paragraphs that follow.

a. Offensive. Offensive air combat operations are planned because intelligence identified lucrative targets during the IPB. These missions are

preemptive attacks coordinated through the maneuver commander against air-related targets forward of the FLOT. Typical targets are aircraft staging areas, airfields, launch sites, aviation C² nodes, and aviation logistical facilities that cannot be effectively attacked by Army indirect fires. Although Army indirect fires and Air Force air interdiction assets are best suited for these operations, nonavailability of these assets may require that Army aviation assume the mission. The actual mission, if assigned to aviation forces, is a deep attack/raid air-to-ground operation usually carried out at night or during adverse weather. The primary aviation assets for offensive air combat operations are air cavalry and attack helicopter units of the aviation brigade and special operation forces. These assets may also conduct defensive air combat as necessary to protect the force or as a self-defense measure. Attack helicopter/air cavalry units transit the Threat zone of operations employing ASE and night vision devices that permit high speed, contour flight beneath the enemy air defense missile envelope. Premission planning enhances enemy air defense avoidance through near real-time intelligence provided by Army and joint assets during the staff planning process. These units employ fire and maneuver to engage enemy airborne threats with air tactics in air ambushes or in chance encounters. At the objective, aircraft then engage air-related ground targets with air-to-ground systems/munitions including area munitions and precision-guided munitions all employed from standoff ranges.

b. Defensive. Defensive air combat operations include meeting engagements or chance encounters that may occur anywhere on the battlefield. The ATKHB plans and conducts defensive air combat operations as an integral part of its combined arms mission. The force commander may divert or task attack helicopter units to conduct defensive air combat operations.

(1) Deep operations. Deep operations are associated with preemptive air attacks or offensive air combat. However, air assault and attack helicopter units conducting reconnaissance or security missions in support of an offensive air combat mission may become involved in defensive air combat to protect the force or as a self-defense measure.

(2) Close operations. Because of the expected high density of enemy air defense and direct fire weapon systems, aviation forces will not normally execute sustained defensive air combat operations along the FLOT. Attack and scout aircraft conducting reconnaissance, security, or antiarmor missions use air combat tactics for self-defense or to protect the ground maneuver force as necessary. These actions will be brief and intense. In addition, a selected number of Army utility helicopters and FAOs may be armed with ATA missiles for self-protection. As an extension of their assigned mission, these aircraft will be involved in air combat when the air threat attempts to remove them from the friendly maneuver force.

(3) Rear operations.

(a) Air combat during rear operations normally takes place in the brigade through corps rear areas. The ATKHB with its companies employed in a defensive air combat role as part of rear operations protects friendly maneuver forces and combat support and combat service support elements from

enemy helicopters and CAS aircraft. An ATKHC can be employed to intercept heliborne forces and actively seek out and destroy hostile aircraft over friendly territory. The ATKHC that is employed will, however, be integrated in the combined arms rear operations effort. ATKHCs can also protect possible air avenues of approach, zones where the Threat has successfully suppressed friendly air defense, or avenues of approach unsuitable for ground AD employment. The ATKHB will remain under control of the maneuver commander and be employed in areas determined by the maneuver commander after coordination with aviation and ADA commanders.

(b) When assigned an air combat mission, the ATKHB commander coordinates with the air defense command to receive FAAD C²I target and vectoring data, flight corridor information, and other pertinent data directly. When diverted from the mission, the ATKHC commander is notified through secure means and provided with target and flight route updates by Army/joint "look-down" and FAAD C²I sensor data through the rear TOC. The ATKHC commander then selects battle positions from which to engage the Threat air elements, moves his forces to these locations, places his aircraft in a terrain-masked position, and engages the Threat using surprise and ambush techniques from the flank and rear. ATKHB assets will be employed as necessary to cut enemy air lines of communication should the Threat establish an airhead in the rear area.

B-4. COMMAND AND CONTROL

Because tactical flexibility is required in air combat operations, the ground force and aviation commanders must ensure that their intelligence information is timely and accurate. Each commander must also ensure that his intent and tactical guidance are relayed to all of his subordinate leaders.

a. Facilities. The ATKHB commander does not need to array his C² facilities, or command posts, for air combat operations differently than for other tactical operations. Because of the short-lived, violent, and reactive nature of air combat operations, the commander must be extremely flexible and in a position to act quickly and decisively. Therefore, the commander's aircraft may be the optimal location for a tactical CP during air combat operations.

b. Relationships. Air combat operations are often mission-specific and limited in function and time. Even when they augment other aviation units, units with these missions are usually operationally controlled. An aviation unit with an air combat mission may be placed in varied C² relationships. The following command relationships emphasize that the maneuver commander will be orchestrating the combined arms counterair battle in his area of operations.

(1) At division level, the aviation brigade may have ATKHBs under division control. ATKHBs may also be under operational control to maneuver units (maneuver brigades or the tactical combat force for rear area missions).

(2) At corps level, the corps aviation brigade might have ATKHBs under corps control, or they may be operationally controlled/attached to the tactical combat force. (The ATKHB will be attached if the TCF is aviation.) ATKHBs may also be operationally controlled to a ground maneuver brigade of a division or operationally controlled/attached to an aviation brigade in a division.

c. Process. The advent of high technology systems will integrate and link aviation, air defense artillery, and other combined arms assets under one counterair umbrella controlled by the maneuver commander. The maneuver commander's A²C² network is his most efficient means of coordinating air defense operations with aviation components. The A²C² system is fed information from the Army fire support, ADA, and aviation C² systems at all levels.

(1) Based on the factors of METT-T, the maneuver commander decides when and how to use aviation assets in an air combat role as part of his air defense plan. His decisions are guided by a control framework established by the area air defense commander. The AADC uses ROE as a positive and procedural means to prescribe exact conditions under which engagements of airborne aircraft can be conducted. For the ATKHB, applicable components of these measures are the weapons control status and hostile criteria. Authority for establishment of WCS will normally be delegated to the maneuver force commander. This authority allows the maneuver commander to declare the WCS for the ATKHB operating under his control as best supports his concept of operation. The three WCS are weapons-free, weapons-tight, and weapons-hold.

(2) Hostile criteria establishes the rules that are used to identify aircraft as hostile or friendly. Engagement decisions made by the subordinate elements of the ATKHB are based on the WCS in effect for the ATKHB and the hostile criteria established. The WCS varies with the type of air threat (fixed- or rotary-wing), area of the battlefield, and density of local friendly air defense. An ATKHB tasked to perform air combat operations could be operating under a WCS of weapons-free while local ADA forces are operating under weapons-hold. The ATKHC commander maintains control of his company throughout air combat engagements in a manner no different from other operations the ATKHC conducts. Normally, the ATKHC conducts air combat operations in the following sequence:

- ATKHC elements maintain air security commensurate with the expected air threat.
- At least one aircraft in each platoon monitors the FAAD C²I net or ADA early warning net.
- ATKHC elements perform briefed actions on contact.
- ATKHC coordinates fires from combined arms or joint assets, if available.
- ATKHC limits weapons effects on friendly ground forces.

- ATKHC reports to higher headquarters for relay to AD early warning net.
- ATKHC reconstitutes and continues mission.

(3) If an ATKHB makes contact with enemy helicopters, it may avoid the enemy force and employ other combined arms elements or destroy the enemy aviation force to accomplish or continue the primary mission. Whatever the decision, aviation units must attempt to avoid a decisive engagement with a superior enemy air threat when planning and conducting air combat operations. In air combat engagements, aircrews must see the enemy first, make the decision whether to attack, use direct fire weapons to press home the attack, and disengage and exit from the conflict rapidly. In all cases, selection of weapons must be done quickly. The goal of the attack is to fire first and destroy the opposing helicopters using all the shock and firepower available.

(4) Engagement distance depends on the weapon system used. Cannon fire may be effective out to 1,500 meters and generally employed in the close-in fight. The long flight time and limited tracking capabilities associated with ATGMs limit their use in air combat engagements. Folding fin aerial rockets are an effective weapon to slow an attacker and break up large formations of aircraft at extended ranges. The air-to-air Stinger gives Army aviation a fire-and-forget capability to engage enemy helicopters at extended ranges. It should be used at maximum range before the enemy can detect US helicopters. Although the ATAS is an excellent air-to-air weapon, it has a pronounced smoke signature and is difficult to employ at short ranges against a maneuvering helicopter. In addition, all available suppressive fires of the combined arms team should be used to destroy enemy aircraft.



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Appendix C

DEEP OPERATIONS

This appendix describes one of many possible scenarios for corps aviation brigade employment during deep operations. The scenario demonstrates many of the planning and execution tactics, techniques, and procedures from corps to ATKHB level.

C-1. CORPS AVIATION BRIGADE PLANNING PROCESS

The corps commander's operational concept is to integrate his corps plan with the 1st Army Group. He also wants to prepare for the counterattack by the 11th Corps (Figure C-1).

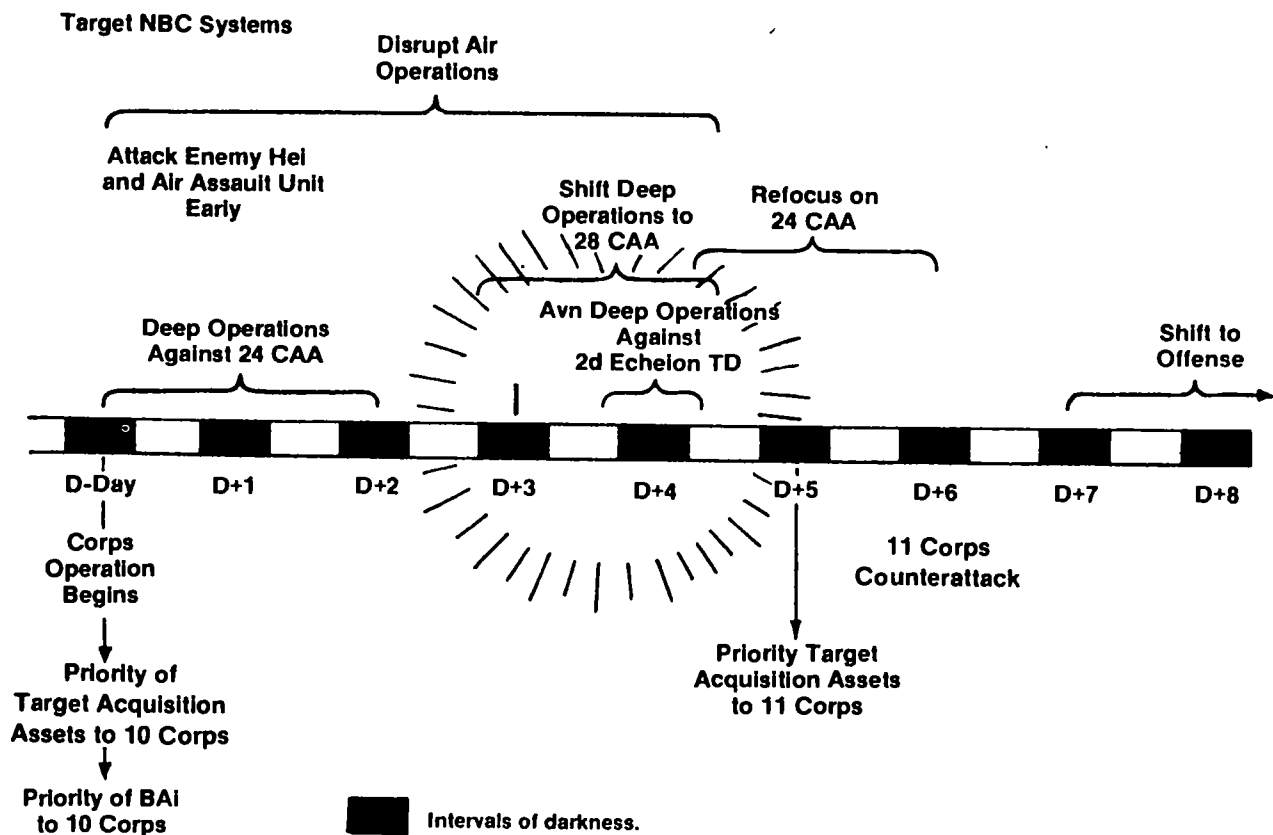


Figure C-1. Guidance from the corps commander

a. The aviation portion of the combined arms plan is extracted from the corps targeting guidance that is developed from the corps commander's intent. The corps commander will ensure that the deep operations focus at D+3/D+4 is on the 28 CAA. He wants to attack the second-echelon tank division of that army as it is being committed to the fight. Before attacking that tank

division, the corps commander will order a shift in the corps EW priority on D+3/D+4 to support the SEAD. This request is transmitted to EAC and modified or supported by the army group commander.

b. Attacking the enemy follow-on echelons is one of the missions of the ATKHBs in the attack helicopter regiment of the corps aviation brigade. The ATKHBs conducting a deep attack will normally operate at night; they require 24 to 48 hours of planning time. They also require accurate and timely intelligence before and during the mission. Aviation deep attack should be characterized by high-payoff targets that are critical to the corps commander's campaign plan.

c. The corps IPB to support the aviation portions of the mission will include terrain analysis to determine the effect of terrain on both enemy and friendly operations. Weather and illumination during the deep attack are also analyzed from both perspectives. Members of the planning staff must be familiar with the capabilities and limitations of enemy and friendly systems. Army aviation factors include NVD effectiveness, infrared crossover, and Hellfire missile environmental characteristics.

d. The enemy's disposition will be portrayed with templates to reflect the situation during the deep attack. This analysis will include the targets, the 22d Guards Tank Division, and enemy air defenses that can directly or indirectly alert and engage the friendly aviation force. It will also include uncommitted forces that could affect the situation during the deep attack.

e. Friendly forces must avoid mistaking an uncommitted enemy force for the target. Also, the brigade S2 wants to identify an uncommitted force that could influence the attack. NAIs are established to identify or confirm possible enemy actions. TAIs are established to expedite the delay, suppression, or destruction of the enemy unit. Decision points will be selected considering friendly response times and enemy movement rates.

f. The corps IPB is continuous. Intelligence collection and analysis efforts feed the process. This process integrates the analysis of terrain, weather, and the enemy to support the recommendation of--

- Ingress and egress routes.
- Release points.
- Rally points.
- Holding areas.
- Battle positions.
- Downed aircrew pickup points.

g. First the terrain and weather estimates of the engagement area are completed. Then potential aircraft routes are considered. Weather

conditions en route do not have to meet the requirements for the target engagement area because aircraft systems allow aviators to fly in visibility too low for Hellfire missile employment. Air routes should bypass enemy units, especially air defense. Terrain should afford terrain masking; for example, swamps, hilly terrain, mountains, and dense forests.

h. During the IPB, NAIs and TAIs will be designated. TAIs eventually become engagement areas for attack helicopter operations and areas in which targets are located for artillery fires and EW targets. Intelligence collection and analysis efforts support the IPB.

i. The corps IPB determines which specific second-echelon target is selected. The corps staff constructs an attack criteria matrix (Figure C-2) that lists and compares specific targets and considers time of attack. The effect on the target, the duration of the effect, and the attack system best suited to destroy or delay the enemy element are analyzed.

ENEMY ACTIVITY	TARGET/TARGET SET	ATTACK TIME	DESIRED EFFECT	DURATION OF EFFECT	ATTACK SYSTEM	COMMENTS
AIR OPS		D-DAY/D+2	DISRUPT DEEP STRIKES			PROTECT COSCOM, BRIDGES, 11 CORPS
			PREVENT AIR ASSAULTS			BRIDGES OVER KANSAS RIVER
NBC		D-DAY/INDEF	DESTROY	PERMANENT		PROTECT BRIDGES
MANEUVER	AIR ASSAULT	AS ACQUIRED				FRONT & ARMY ELEMENTS
	2D ECH MRD/24 CAA	D-DAY/D+2	DEGRADE DEF CAPABILITY	INDEF		HAND OFF TO DIV, NO COUNTERMOBILITY
	2D ECH TD/28 CAA	D+3/D+4		INDEF	AVN BRIGADE	SEAD
	25 TA	D+4/D+5	DELAY MOVEMENT	INDEF		SYNCH W/11 CORPS
C ²	24 CAA	D-DAY/D+2	DISRUPT	24 HOURS		"AT RIGHT MOMENT"
	ADA	D+3/D+4				SEAD

Figure C-2. Attack criteria matrix

j. Through analysis, these targets become specific high-value target sets (Figure C-3) that are critical to the corps plan. In this scenario, that specific target is the second-echelon tank division, the 22d GTD of the 28 CAA. Based on target analysis and the corps commander's guidance, this plan calls for the 22d GTD to be attacked as it moves from its assembly area to the forming-up point. That forward movement is expected to take place at night. From the high-value target set analysis, the corps staff can recommend an appropriate system. The only systems that could hit the second-echelon tank division are BAI, ATACMS, and Army aviation. Because night-capable BAI systems are very limited and ATACMS Block I is mainly for soft targets, Army aviation may be the only choice for a night attack against a

deep, armored column. BAI missions are requested for first light as a backup to the attack helicopter deep attack in case AH-64 units cannot meet the night attack window or enemy units do not move as quickly as planned.

ENEMY ACTIVITY	TARGET/TARGET SET	QUANTITY	ATTACK TIME	DESIRED EFFECT	DURATION OF EFFECT	ATTACK SYSTEM	COMMENTS
AIR OPS	FACs	(6)	D-DAY ON	DESTROY	PERMANENT	AREA-TYPE	
	VTDPs	(8)	D-DAY ON	DESTROY	PERMANENT	AREA-TYPE	
	FWD OP BASES	(2-8)	D-DAY ON	DESTROY	PERMANENT		
NBC	SSM TELs	(26)	D-DAY ON	DESTROY	PERMANENT		
	SSM FOC	(7)					
	SSM NASP	(8)					
	SSM MET RADAR	(6)					
MANEUVER	20 ECH MRD/24 CAA	(4 X REGT +)	D-DAY TO D+2	DELAY	BEYOND D+3	BAI/ ATACMS	NO COUNTERMOBILITY
	20 ECH TD/28 CAA	(4 X REGT +)	D+3/D+4	DESTROY	PERMANENT	AVN BDE	SEAD, ECM, BAI
	25 TA	(4 X DIV +)	D+4/D+6	DELAY	24 HOURS	BAI	LIMIT EARLY, DISRUPT
C ²	CPs/24 CAA	(5)	EARLY D+3	DESTROY	PERMANENT	LANCE/ ATACMS	
	ADA	(4 X ADA REGT +)	D+3/D+4	DISRUPT	DURATION OF AVN BDE OPS	EW(+)	SEAD
ADA	SA 11 TEL RADARS	(100 +)	D+3/D+4	DESTROY	PRIOR TO H HOUR	MLRS/ LANCE/ ATACMS/ WW	SEAD INTEGRATE DIV
	SA 11 COMM NETS	(8)	D+3/D+4	DISRUPT	AT H HOUR	EAC ECM	- AIR AXIS +8 KM - ALL ACTIVE
	SA 12 TEL RADARS	(86)	D+3/D+4	DESTROY	PRIOR TO H HOUR	LANCE/ ATACMS/ WW	- AIR AXIS +8 KM
	SA 12 COMM NETS	(4)	D+3/D+4	DISRUPT	AT H HOUR	EAC ECM	- ALL ACTIVE

Figure C-3. High-value target sets

k. With the corps commander's issuing his guidance at H-96, the staff planning process begins (Figure C-4). The G2 staff begins to analyze terrain. Using maps and photos and with the help of the engineer topographic team, the staff analyzes projected ingress and egress routes as well as potential engagement areas. The staff examines the combined effects of weather and terrain as well as available moon, star, and manufactured illumination. The staff also considers the effect that the enemy disposition may have on friendly operations. It considers particularly the major target, the

second-echelon TD, enemy AD locations, and major uncommitted units (regiment and higher). NAIs are selected based on terrain where the enemy commander has to make decisions. The TAI, which becomes the engagement area for the aviation attack, is selected based on terrain. The charts show a break between situation development and target development; however, both are continuous. H hour is established for all systems participating in the deep attack. In this instance, it is 1900 on D+3. H hour in the deep attack scenario is the time when all systems are ready to perform their mission. This condition must take place before the enemy target arrives at the engagement area. The H-hour time must allow for the suppression of enemy systems that were identified during the IPB. The H-hour time must also be selected so that artillery, MI, and Army aviation units can prepare before the enemy arrives at the engagement area. The H-hour, or ready, time must allow time for the units to be alerted, move to their positions, and conduct the mission.

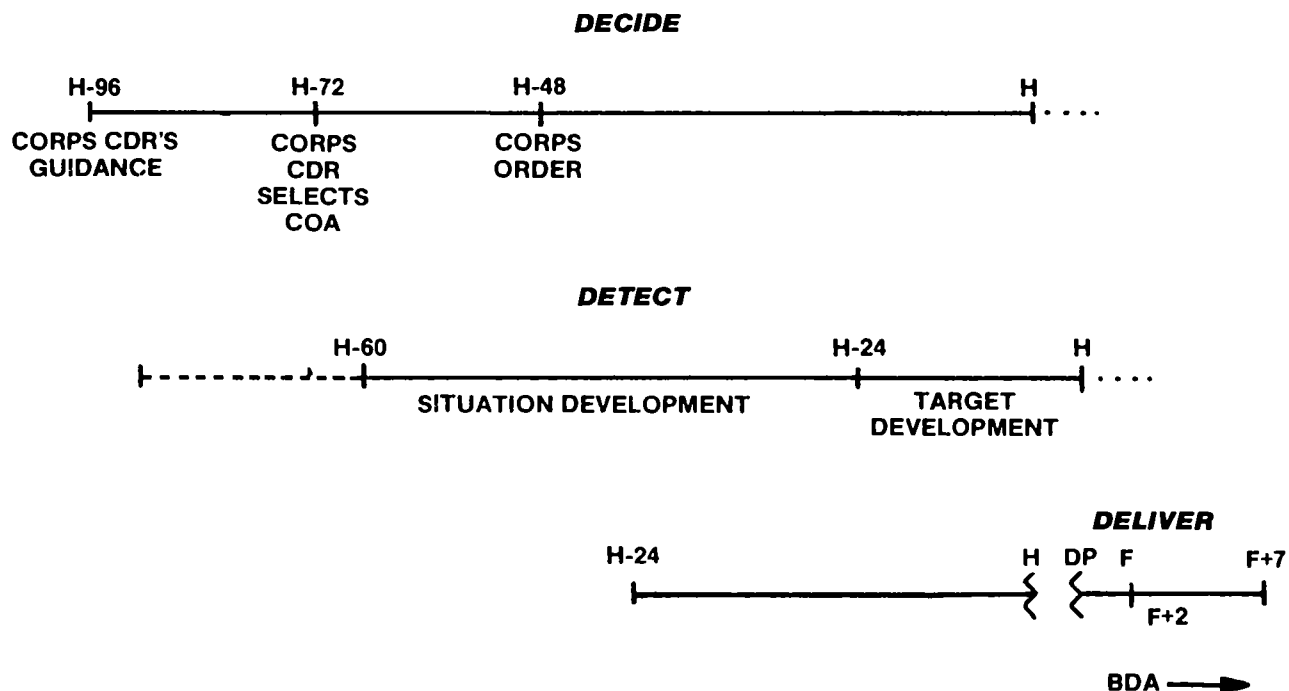


Figure C-4. Intelligence support

1. The corps planners begin an IPB at the front end of the mission analysis. They develop a sensor matrix that matches sensors to targets; these sensors must be able to collect against the targets. This matrix will assist later in preparing the collection plan.

m. All-source analysis has projected that the 22d GTD will move from its intermediate assembly area to its forming-up point on the night of D+3 (Figure C-5). From the IPB, corps planners select an engagement area along the two principal avenues of approach. The engagement area should canalize enemy forces and restrict their movement as well as provide terrain masking and good fields of fire for attack helicopters.

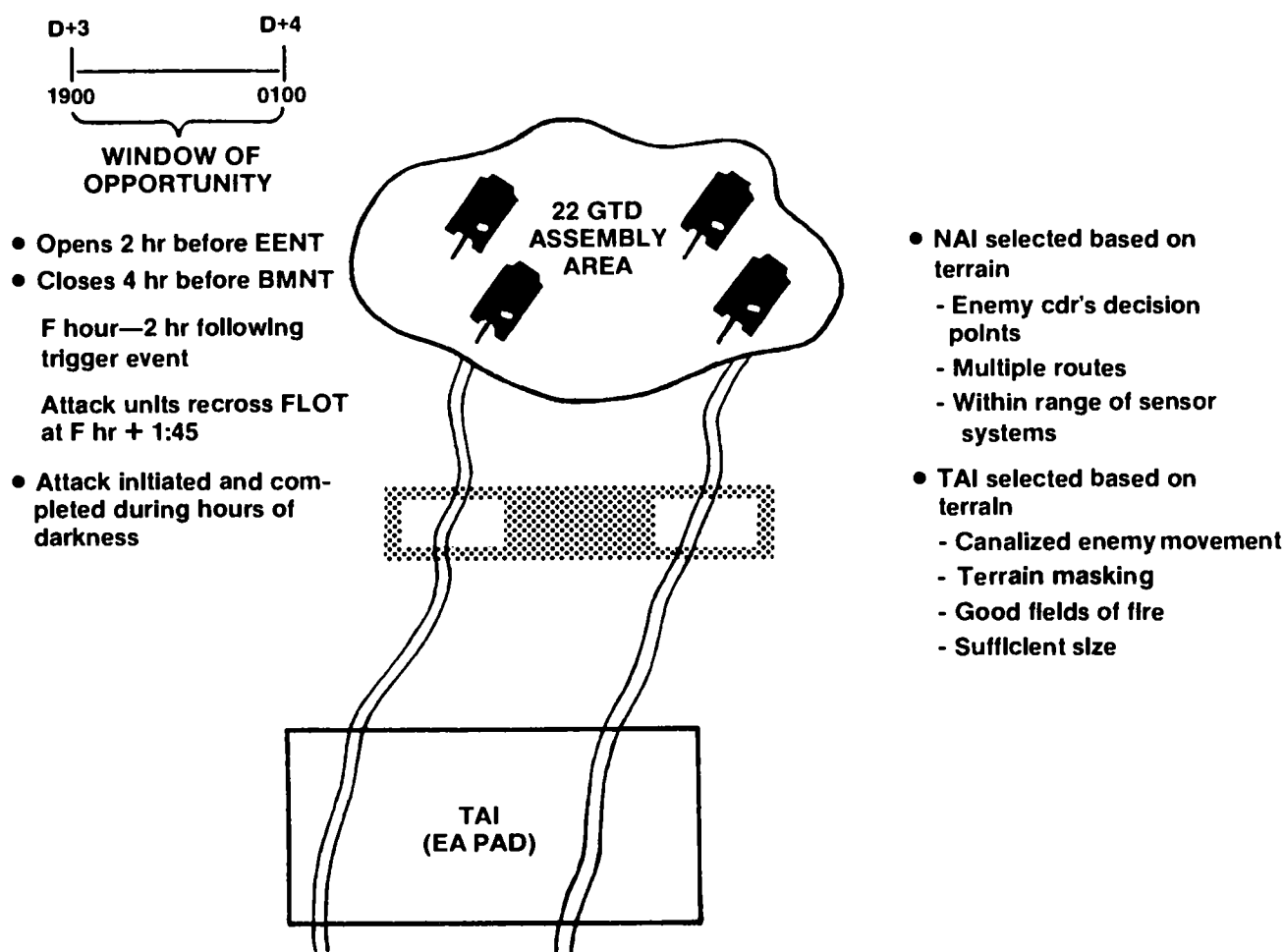


Figure C-5. Designation of NAI and TAI

n. The engagement area is designated as EA PAD. About 20 kilometers wide and 50 kilometers deep, it is about 60 kilometers from the intermediate assembly area. The enemy march columns should reach EA PAD from the intermediate AA in about three hours. From the friendly FLOT to the center of EA PAD is about 70 kilometers.

o. During planning, it was determined that the aviation units require a two-hour notice before the enemy enters EA PAD. Thus after units fly to EA

PAD, they will still have time to finalize and execute the SEAD plan; they will also have time to complete other supporting plans and actions. NAIs were chosen along the avenues of approach about a two-hour traveling distance from EA PAD. This calculation is based on a 20-kilometer-per-hour rate of march.

p. The plan is to use Mohawk SLAR (UPD-7) and LRSUs to monitor the enemy's movement out of the intermediate assembly area into the NAI and TAI. When the number of armored vehicles moving out of the AA reaches the threshold established by the corps, the LRSU teams report back to the CTOC. The movement also detected by the Mohawk SLAR will confirm the movement out of the AA.

q. Corps planners have recommended an attack on the 22d GTD. Sensing packages and attack means are identified. The corps commander then orders the aviation brigade to attack the 22d GTD.

r. The collection, management, and dissemination section directs the collection effort against the main target. Situation and target development efforts must also be focused on targets that may interfere with the aviation brigade mission; the attack helicopter operation will require SEAD. Therefore, at this stage, the intelligence staff is also tasked to collect information on enemy AD targets along planned routes of ingress and egress; the staff will also collect information in and beyond the planned engagement areas. Targets are located on enemy AD installations during this collection effort; these locations are provided to the FSE to update the fire support plan that supports the attack. This fire support plan includes not only lethal attack on AD targets but also nonlethal (EW) attack. The G3 requests EW support from higher headquarters to engage AD targets in depth. He coordinates with the corps G2 in tasking division EW assets needed to support FLOT penetration by jamming AD command and control nets near the FLOT. EW support is executed during planned lethal attacks. The mechanisms for accomplishing this tasking are the fire support plan and the EW annex, both of which are continuously updated.

s. A collection plan based on available resources is developed to support the situation. Early in the decision phase, the corps G2 (the CM&D section) will devise a plan. This plan will provide adequate coverage, synchronize sensors (cueing, cross-cueing, and jamming), request national and theater assets, and begin to provide intelligence support to SEAD. The aviation brigade warning order is issued at H-72. The aviation brigade tactical CP relocates near the corps main CP shortly after the warning order is issued. This movement occurs in darkness. Figure C-6 identifies key actions in this segment.

- Prepare collection plan based on COA/HPT list
- Prioritize collection of—
 - Enemy AD targets (national ELINT, QL II)
 - Enemy activity (national/theater Imagery, OV-1D SLAR, IGRV, LRSU)
 - Targeted tank division
 - Uncommitted units
- Plan collection effort against enemy AD in conjunction with current friendly air operations

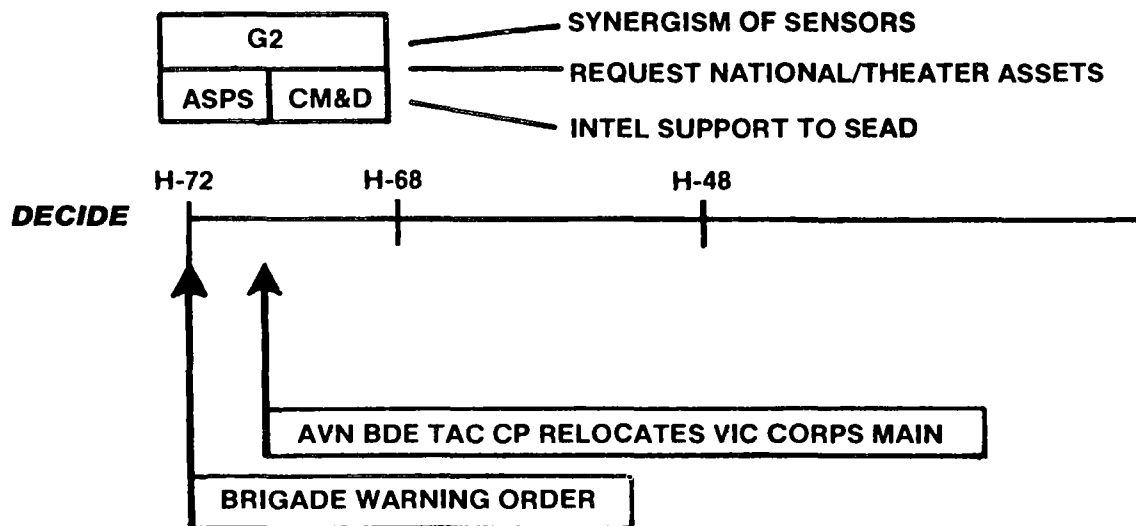


Figure C-6. Event sequence

t. The target list is based on the course of action selected by the corps commander (Figure C-7). The targeting element will develop target sets, time lines, priorities, and planning considerations. The aviation brigade target list will include targets such as--

- Tank and MR AD systems (ZSU-23-4/2S6 and SA-9/SA-13).
- Divisional AD batteries (SA-6/SA-8).
- Army-level systems (SA-11/SA-12).
- The second-echelon tank division.

The aviation brigade commander will restate the mission to the corps commander 8 to 12 hours after receiving the mission. The aviation brigade commander and the G2 will also submit requirements for intelligence support.

EVENT SEQUENCE

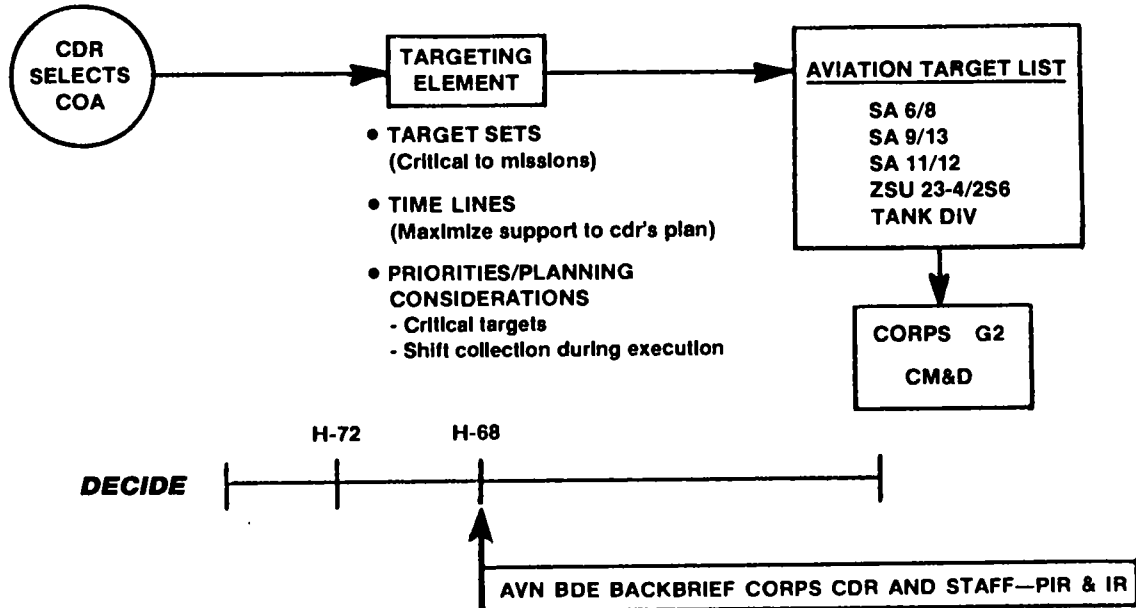


Figure C-7. Development of the target list

u. About H-60, specific orders and requests are sent to corps subordinate divisions, the MI brigade, adjacent corps, and EAC. The corps G2 (ASPS and the CM&D section) develops the requests and passes them to the MI brigade (Figure C-8). The technical control and analysis element will take the prioritized collection targets and turn them into collection taskings for the sensor platforms. The TCAE will search its enemy electronic order of battle data base for the location of radar emitters for enemy AD units that can track the attack helicopters along the ingress route, engagement area, and egress route. The TCAE also searches its technical data base for frequencies and call signs for the C² elements of specific AD units--the 22d GTD and the Army CP. This data is passed to the Guardrail IPF for the Guardrail mission. The S3 section of the MI brigade plots Guardrail flight tracks that will optimize the collection of COMINT targets. The section will also plot Quick Look II flight tracks for ELINT targets and Mohawk flight tracks for SLAR collection. These airspace requirements are then passed to the A²C² element of the corps for inclusion in the corps A²C² plan. This process is refined and updated within 22 to 24 hours.

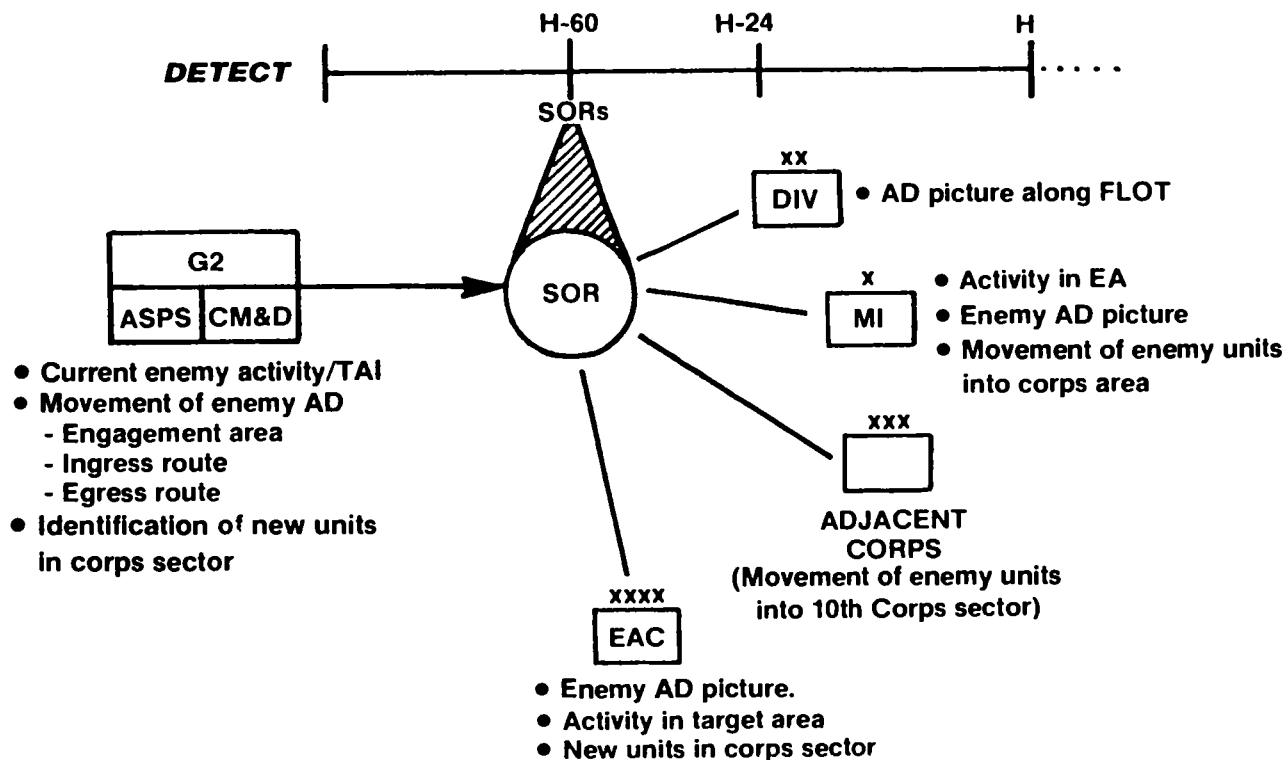


Figure C-8. Implementation of new taskings (SORs)

v. From H-60 to about H-24, sensors are identified to cover the corps area of interest on a more or less equal coverage basis. Quick Look II begins to locate the SAM radar sites, IGRV begins to intercept communications of the 28 CAA, and Mohawk SLAR monitors the enemy's movement forward. These sources provide an idea of the flow of the battle and possible enemy objectives or intentions. LRSU is inserted; it positions itself to support the operation as planned. Theater and national assets are requested to provide support as needed and to cover areas beyond the range of corps organic sensor capabilities.

w. During the processing and analysis, special attention is given to targets listed on the HVT list. The collection results reflect friendly capability to detect, identify, and locate targets. The HVT list is developed and refined based on the collection.

x. The target list provides the target descriptions, attack times, and attack methods; indicates battle damage assessment; and contains remarks concerning integration. The target list is shown in Figure C-9.

DESCRIPTION	WHEN	HOW	BDA	REMARKS
SA 6/8 (Straight Flush/ Land Roll)	F-0:15	FS/EW		Coord attack with avn bde
SA 9/13	F-0:15	FS/EW		Coord attack with avn bde
SA 11/12 (Fire Dome/ Grill Pan)	Immediately	FS/EW/USAF		
ZSU 23-4/2S6 (Gun Dish/ Hot Shot)	F-0:15	FS/EW		Coord attack with avn bde
Tank div	F+0:45 to F+1:00	Aviation	X	In/along TAI

FS = MLRS/ATACMS BLK 1

EW = Army/USAF jammers

AVN = Army aviation

Figure C-9. Target list

y. The aviation brigade target list is forwarded to the corps G2. During this portion of the decision phase, the aviation brigade commander restates the mission to the corps commander and his staff. The priority intelligence requirements and intelligence requests are established during this time.

z. Figure C-10 depicts the corps aviation brigade organization. This organization is structured to conduct close, deep, and rear operations. The group equipped with AH-64s normally conducts deep operations at night; however, the group equipped with AH-1s fights close operations in the daytime. The aviation group task force conducts CS and CSS operations.

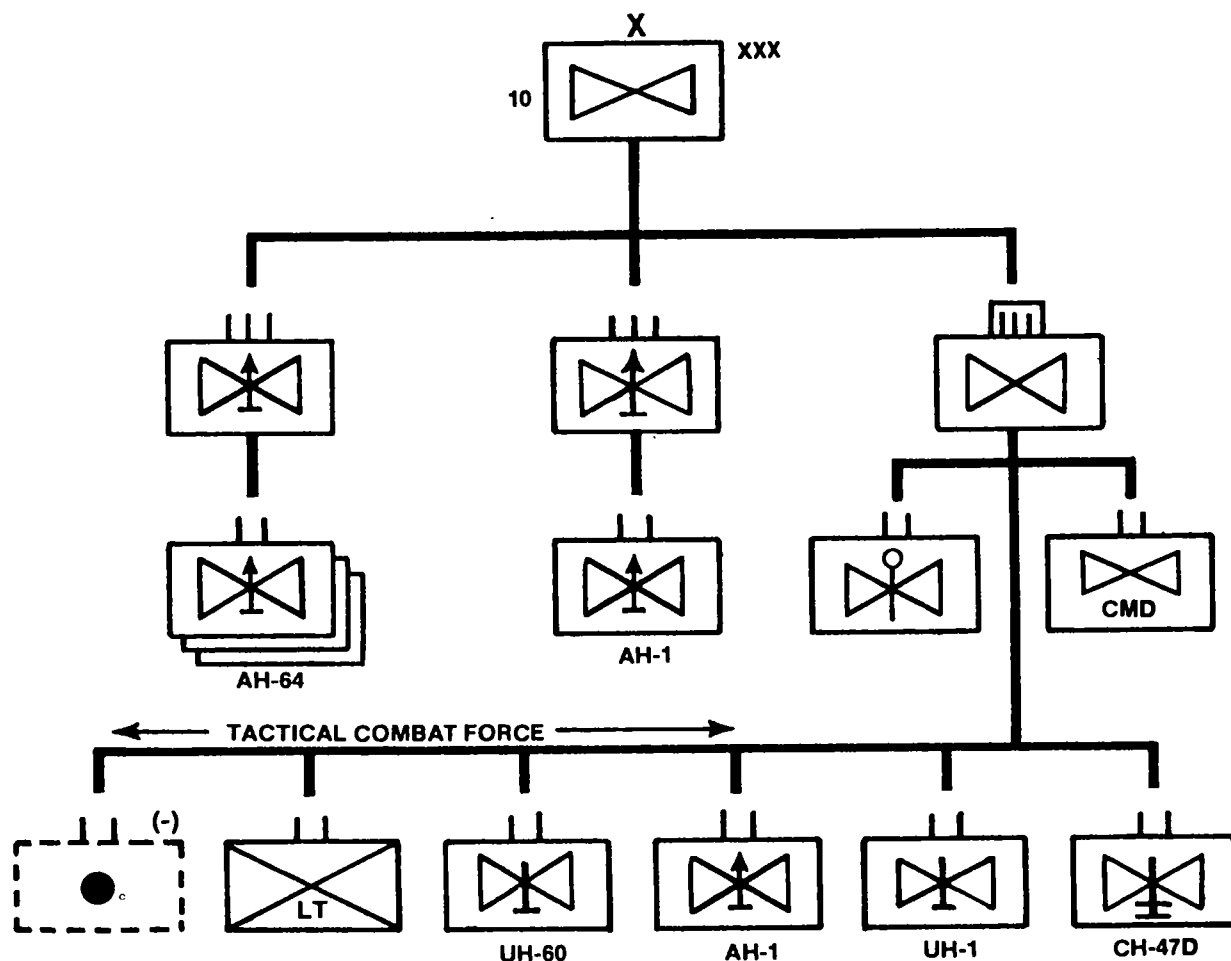


Figure C-10. Aviation brigade organization

C-2. MISSION

a. The ATKHB is well suited to act as a deep operations combat force. It has the maneuver speed, flexibility, and firepower to attack and destroy high-value enemy formations. Although the ATKHB is well suited for deep operations, it cannot execute a deep operation alone. While the combined arms approach is important in close and rear operations, it is critical in deep operations. The ATKHB will be unable to accomplish a deep operation without support and additional combat power. Once the decision to use the ATKHB in a deep operation has been made, it uses corps or division resources to detect the enemy and attack on order.

b. The 10th Aviation Brigade attacks and destroys the 22d GTD in EA PAD during the night of D+3/D+4 (Figure C-11). The aviation brigade commander uses his 103d Attack Helicopter Group (AH-64) for the mission. The group is to attack and destroy the three main tank regiments of the 22d GTD in EA PAD

on D+3/D+4; on order, it has to support close operations. Thus each ATKHB attacks one enemy tank regiment. The 1-103 ATKHB--

- Occupies the attack position.
- Attacks along Axis Alpha.
- Penetrates the FLOT at F hour.
- Occupies battalion attack positions.
- Destroys a tank regiment in its sector of EA PAD on D+3/D+4.
- Returns on Route Handy and conducts rearward passage of lines.

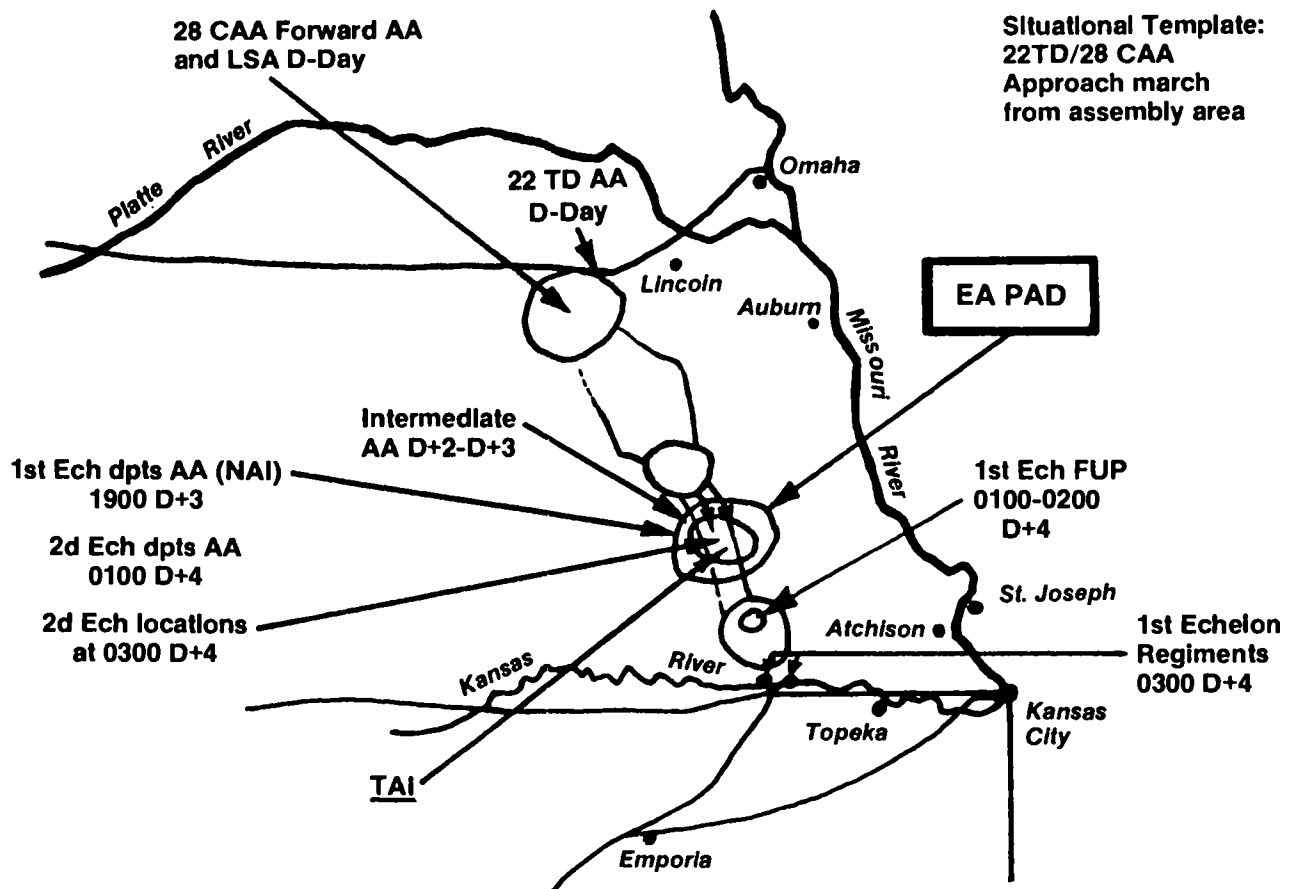


Figure C-11. EA PAD sketch map (situational template)

C-3. CROSS-FLOT ATTACK PHASES

The aviation brigade cross-FLOT attack is conducted in six phases: preparation, penetration, movement to the objective, actions at the objective, return, and restoration. Each phase requires extensive staff planning and coordination from corps level down.

a. Preparation.

(1) Mission analysis. The aviation brigade attacks and destroys the remaining elements of the 22d GTD as it is committed into the battle from its attack position on the night of D+3/D+4. This target is suited for attack helicopters (AH-64) because tanks and other vehicles will be moving on roads in the dark not expecting an attack. The individual tank regiments are out of range for MLRS; they are not suitable for ATACMS Block I.

(a) On D+3/D+4 the attack helicopter regiment attacks to destroy the 22d GTD of the 28 CAA in EA PAD. The aviation brigade commander estimates a destruction criteria of 70 percent of major weapon systems. The combat power of the 22d GTD has been reduced from four regiments down to the combat equivalent of three regiments after previous BAI attacks.

(b) The implied and specified tasks for each of the attack battalions of the attack regiment are to move (D+2/D+3) from the corps rear area forward to occupy assembly areas within range of the engagement area. From these forward positions, the battalions penetrate the FLOT at F hour, attack along an axis to an engagement area, and destroy an enemy tank regiment in EA PAD.

(c) The battalions return to the BP while on an alternate route, conducting a rearward passage of lines; after their return, they are debriefed and they rearm and refuel. Aircraft are carefully checked for battle damage. They receive hasty repair before moving to the rear assembly areas.

(d) The 22d GTD's intermediate assembly area at D+2/D+3 is designated as an NAI. The NAI is monitored by Mohawk SLAR and LRSU as the 22d GTD moves toward the TAI; continuous reports are rendered through the GSM (LPU) back to the CTOC. The 22d GTD will use four or more routes; for simplicity, however, Figure C-11 shows only two routes.

(e) After the corps order is given to the aviation brigade, the intelligence process continues to support the brigade attack. The CM&D section must ensure that appropriate IMINT and SIGINT sensors are available throughout the attack to continuously update attacking aircraft and to provide BDA. Aviation elements are updated through intelligence reports from the CTOC to the aviation brigade tactical CP, located near the corps main CP, via area communications. During the operation, critical intelligence is passed from the CTOC to the aviation force via a Guardrail UHF relay. Another CTT is placed within the corps CTOC (CM&D) and a UHF voice-secure net is established to the aviation units. Over this net, units relay intelligence through one of the two operating Guardrail's AN/ARC-164 radios. This

operation is not germane to the pilot or other operations of Guardrail. The ASPS continues the IPB; thus as enemy units continue their movement, attack battalions receive current intelligence. Movement of some enemy AD units could greatly affect ingress and egress routes.

(f) The aviation brigade uses the corps' IPB as a starting point (Figure C-12). The deep attack area of operations is the main focus for the aviation brigade S2. From the corps IPB, the aviation brigade S2 narrows the focus to address the axis of attack, ingress routes, the objective area, and egress routes. In selecting multiple routes and positions, the S2 considers primary and alternate routes, positions, and engagement areas.

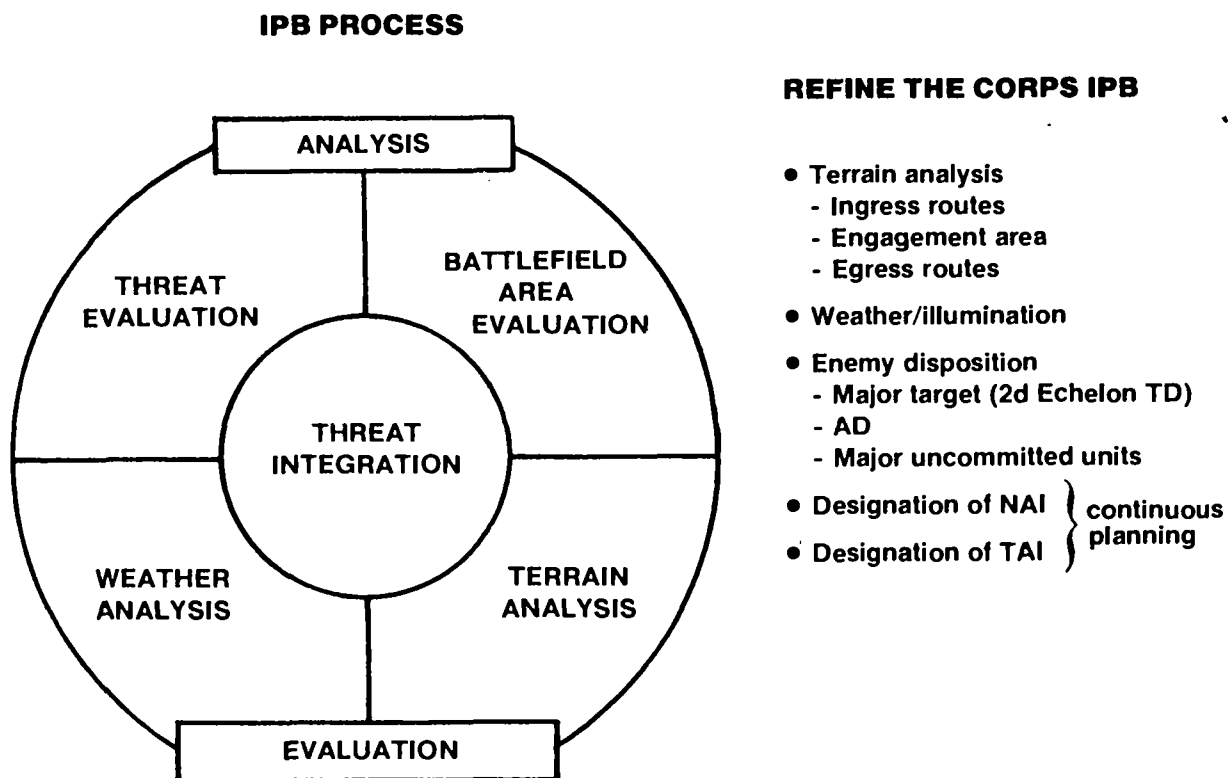


Figure C-12. Aviation brigade IPB

(2) Intelligence support H hour through return. At H hour, all sensors involved from H hour (2100 on D+3) through the return phase must be in place and functioning as planned (Figure C-13).

- Quick Look II focuses on the ingress and egress routes and the TAI to locate SAM radar sites. These locations are fed into the fire support system, suppressed during SEAD fires, and passed to the aviators for attack or avoidance. This suppression continues from F-15

throughout the cross-FLOT operation. Results from Quick Look II also feed the BDA.

- SLAR (OV-1D) monitors the movement of the 22d GTD out of the intermediate assembly area, along the avenues of approach, and into and out of the TAI. This information will be passed to users to update the situation and feed the BDA.
- IGRV intercepts communications within the 22d GTD and from the 22d GTD to army level. One of the two aircraft flying will be functioning as a radio relay to apprise aviation units of the situation and establish a C² link. Results from Guardrail will be used to assess enemy activity and intentions and will feed the BDA.
- LRSU will be in position to conduct surveillance at the NAIs and TAI to report passage of tank units of the 22d GTD by number and type.
- TR-1 (ASARS II) will be requested to surveil the TAI and attack axis for MTI before and during the operation.
- National ELINT will be requested to monitor AD targets in and beyond the TAI.
- National IMINT will be requested to cover the TAI at first light on D+4 to support BDA.

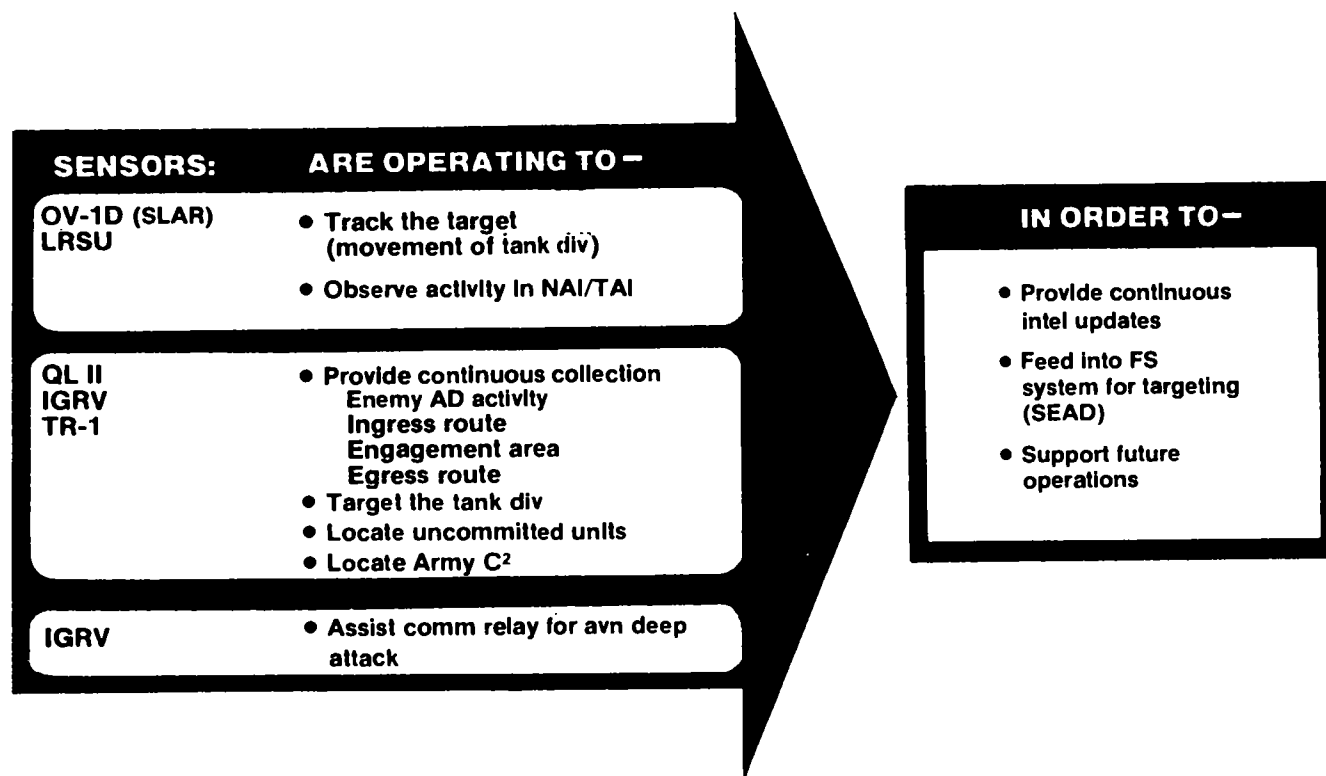


Figure C-13. Intelligence support--penetration through return

(3) Decision support template. The movement of the armored elements of the 22d GTD out of the assembly area through the NAIs is observed at the decision point. The key sensors are Mohawk SLAR and LRSU. This event triggers the aviation cross-FLOT deep attack. This sequence is depicted graphically in a decision support template (Figure C-14). Both Mohawk SLAR and LRSU at the NAIs and TAI (EA) continue to collect and report. These systems continuously update the movement of enemy formations and BDA.

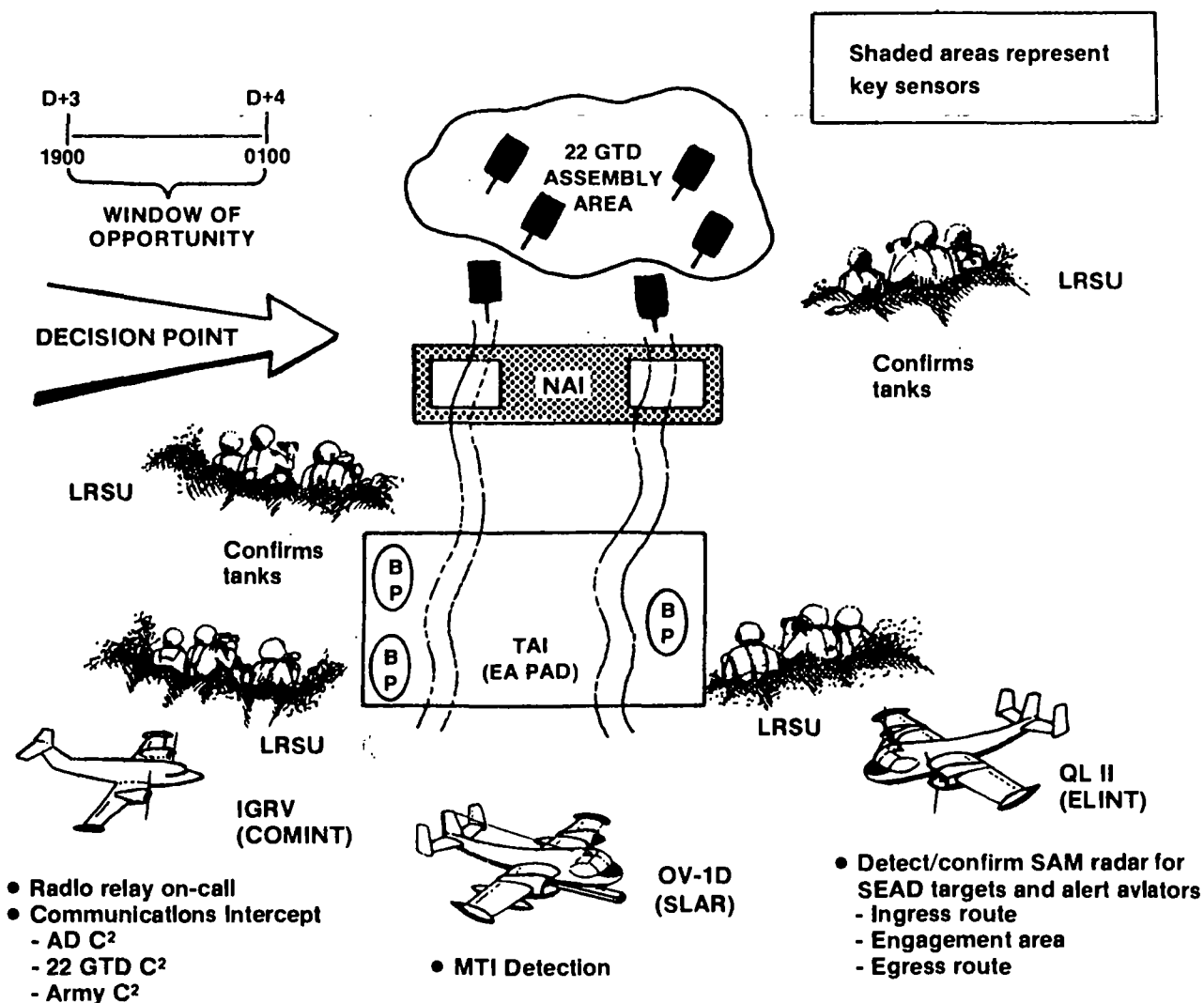


Figure C-14. Decision support template

(4) Task organization. Based on the mission analysis and situation, the attack helicopter regiment commander has task-organized his

force (Figure C-15). The ATKHB comprises 18 AH-64s, 13 OH-58Cs, and 3 UH-60s. For deep operations against a maneuver force, the ATKHC may be task-organized into a scout team (OH-58C) and two attack teams (light and heavy). Also, an OH-58D from the target acquisition reconnaissance company may be attached to each ATKHC. The scout team coordinates passage points and assists the attack teams to and from the FLOT. The light attack team (2 AH-64s) may be equipped with 8 Hellfire missiles, a mix of 38 Hydra-70 spin-stabilized rockets, and 1,200 30-millimeter cannon rounds. The team designates targets for the heavy attack team and provides all-around security. The heavy attack team (3 AH-64s) will equip their aircraft with a maximum load of 16 Hellfire and 1,200 30-millimeter cannon rounds (Figure C-16). The heavy team remotely engages targets designated by the light team.

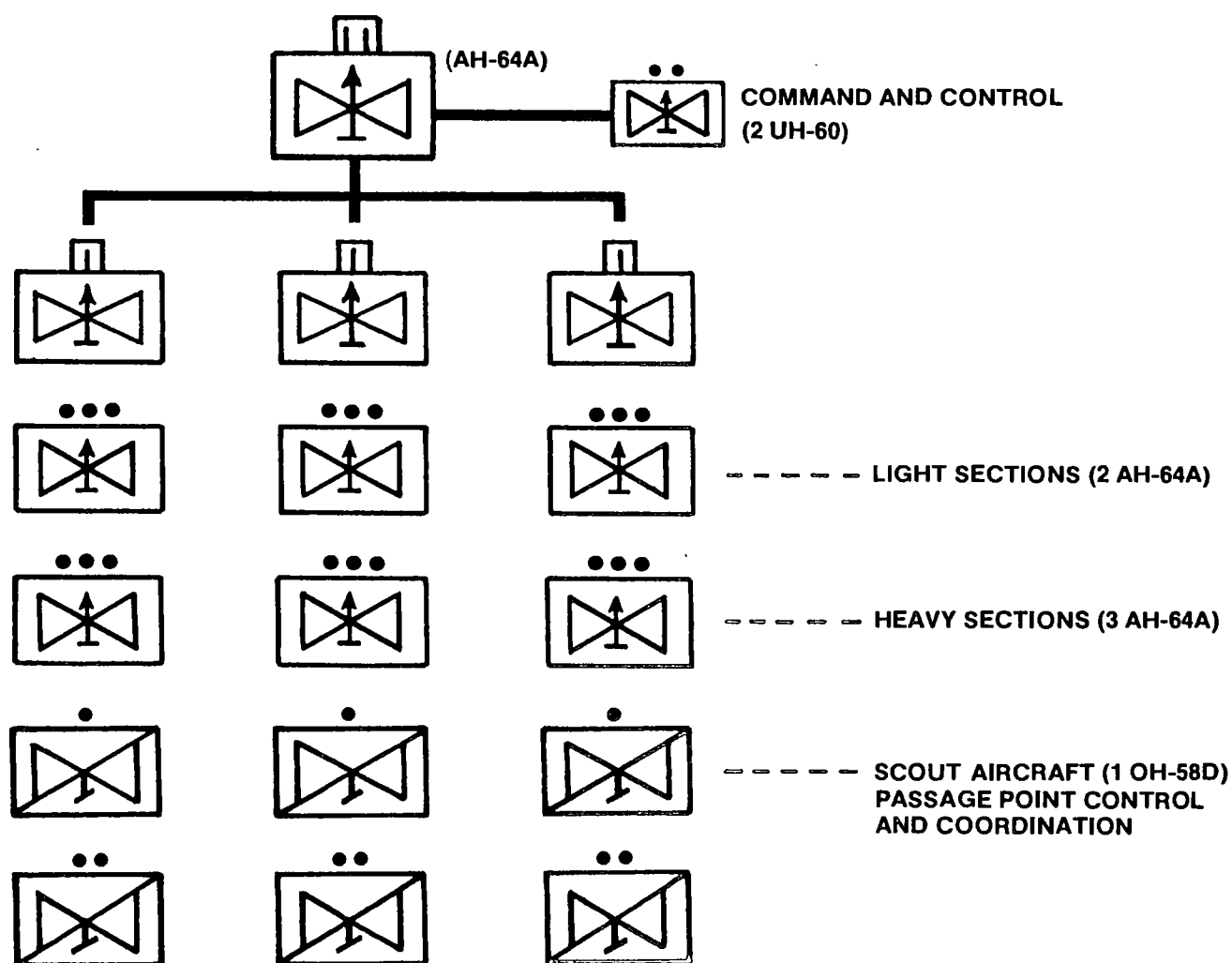


Figure C-15. Task organization of the ATKHB

UNIT	OPERATIONAL AIRCRAFT/ VEHICLE	ATGM	HYDRA 70
A Company	5 AH & 3 OH	64 Hellfire	76 Rkt
B Company	5 AH & 3 OH	64 Hellfire	76 Rkt
C Company	5 AH & 3 OH	64 Hellfire	76 Rkt
HHC	2 UH & 1 OH	0	0
Totals	15 AH, 10 OH, 2 UH	192 Hellfire	228 Rkt
D Company	HEMMT (CL III) HEMMT (CL V)		
TARP (-)	3 OH-58D		

Figure C-16. Friendly force inventory

(5) Gun-to-gun lay matrix. This matrix (Figure C-17) compares the relative combat power of an ATKHB and a tank regiment. The tank regiment has about 150 combat vehicles. With an operational readiness rate of 90 percent, the tank regiment would roll forward with 135 operational combat vehicles. The ATKHB will attack the tank regiment with 192 Hellfire missiles. A probability of hit of 60 percent has been determined from previous firing data, allowing a factor for defective missiles, combat losses, and combat environmental effects. The aviation brigade commander had established a 70 percent destruction goal. This simple process of estimation shows that a possible 115 combat vehicles would be destroyed.

TANK REGIMENT	150 CBT VEH	X (0.9) (OR RATE)	= 135 CBT VEH
ATKHB	192 HELLFIRE	X (0.6) (Ph)	= 115 CBT VEH
		REMAINING TANKS	= 20 CBT VEH
1 BTRY REGTL ADA	4 ZSU, 4 SA13		
1 BTRY MRD ADA	MAX 4 SA6 TEL 1 RADAR		
1 BAI MISSION	INDEPENDENT OPERATION		

Figure C-17. Gun-to-gun lay matrix relative combat power

(6) Command, control, and communication. Key staff officers at the corps main CP normally plan and execute deep operations. Locating the corps aviation brigade's tactical CP 3 to 5 kilometers away from the CTOC and communicating via landline expedite planning. Thus key personnel--the G3, assistant G2, FSO, ALO, and aviation brigade commander--can participate in planning and executing the operation.

(a) The aviation group positions a ground tactical CP; the tactical CP expedites C³ near the FAAs of the ATKHBs. During the mission, the attack helicopter regiment commander may command and control from an airborne tactical CP (UH-60).

(b) The battalion commander's location is key to his decision-making process; it also is crucial to his ability to control battalion actions as the operation unfolds. The forward assembly area is the last face-to-face coordination point between companies of the battalion. The battalion commander can command and control the mission from any location or vehicle he chooses; in the example, however, a UH-60 is used as an airborne tactical CP. There, he is with the fighting force and can make accurate and timely decisions. Any cross-FLOT operation will be battle-drill oriented. Radio listening silence can be maintained during the mission. However, necessary internal ATKHB communications can be conducted as depicted in Figure C-18. Figure C-19 depicts company internal communications. Artillery requests can be passed via FM from the light section to the FSO in the group airborne tactical CP (Figure C-20).

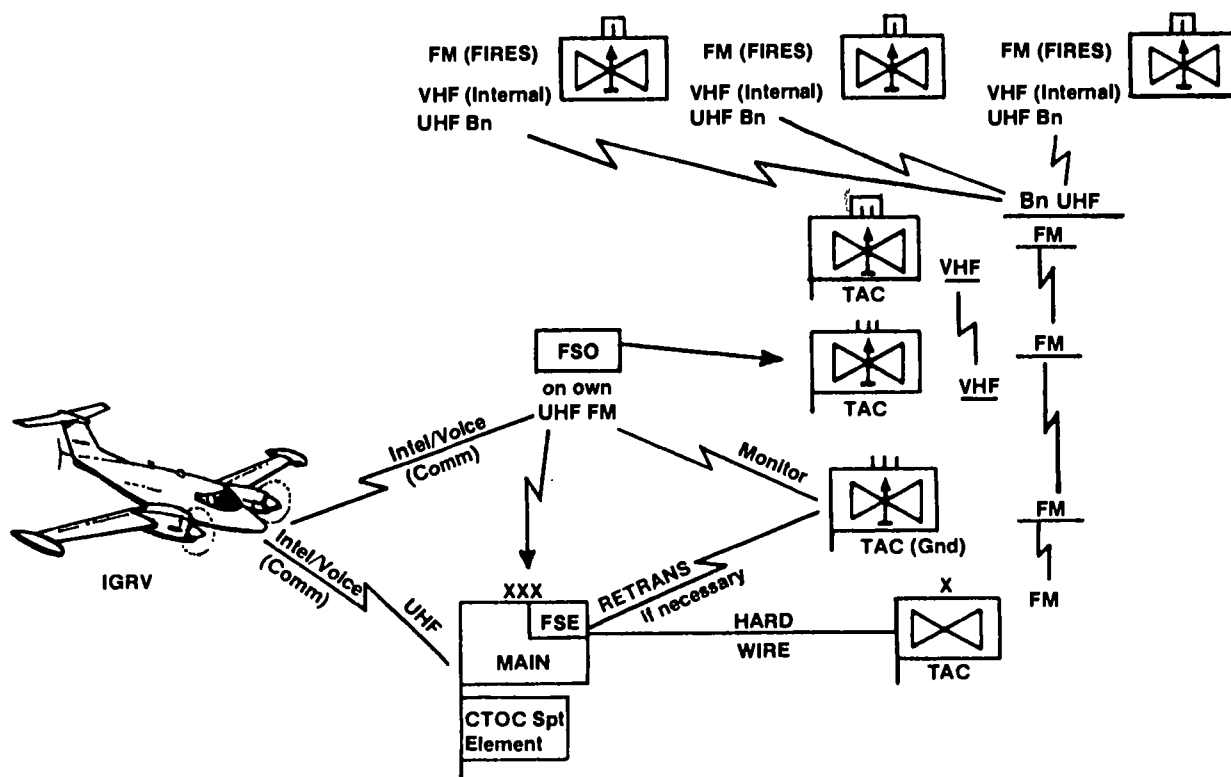


Figure C-18. Aviation communications

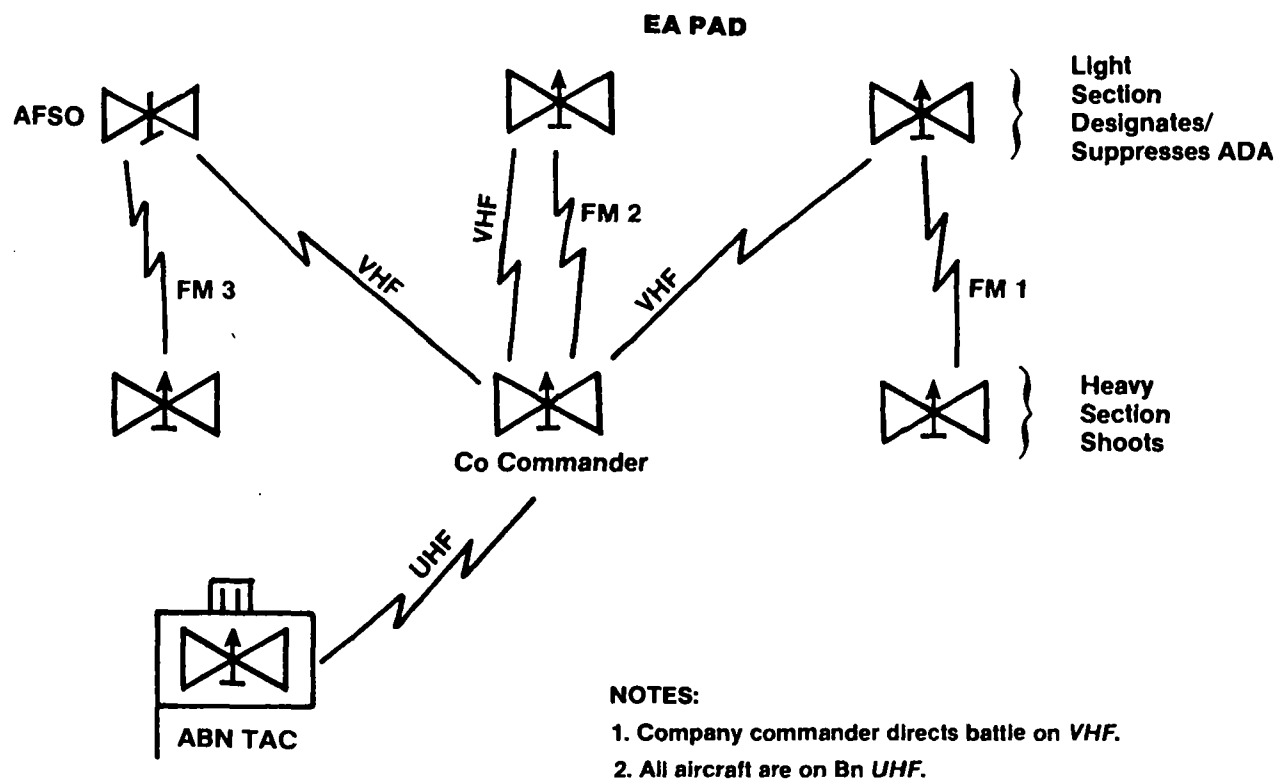


Figure C-19. Company internal communications

(c) Communication between forward-deployed aircraft and CPs is the greatest challenge to ATKHB deep operations. The fluid nature of the battlefield and high-risk nature of this operation require that the attack aircraft battalion commander be able to communicate constantly with the rear CP to receive and relay critical combat information. However, current radio range limitations preclude this communication. In the near future, the only feasible remedy is a retransmission aircraft. The use of the improved Guardrail V is a viable option. The Guardrail will use UHF radio relay from the CTOC to the aviation force commander. Thus constant communications and intelligence updates can be sent to the attack helicopter regiment; also, the attack regiment commander and staff will be able to pass information to the corps headquarters through this relay.

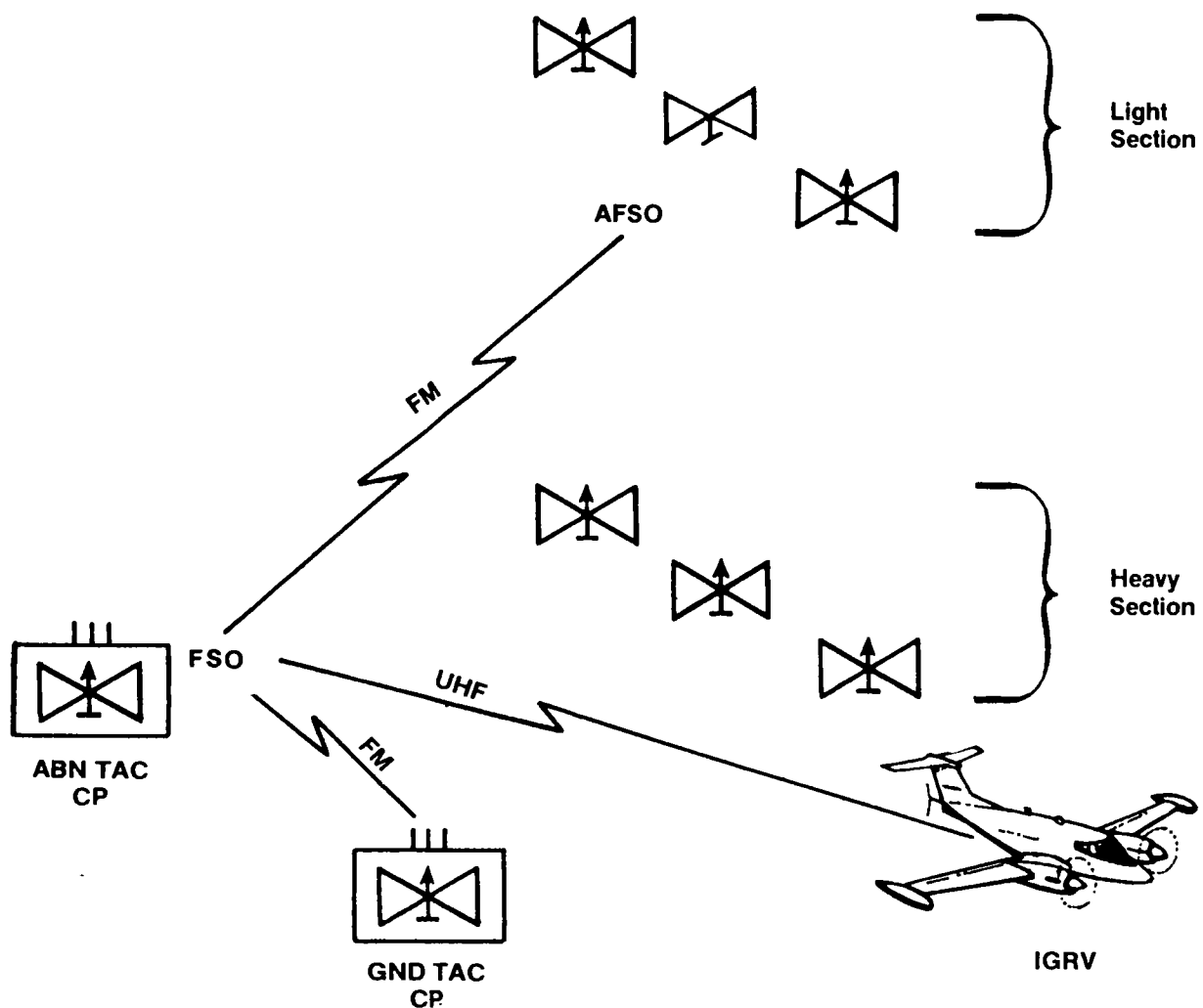


Figure C-20. Artillery request information net

(d) Synchronization and avoidance of fratricide must produce the maximum combat power at the decisive point to defeat the enemy tank regiment in EA PAD. This mission depends on the availability of the corps staff, aviation brigade, and other elements--individually or collectively--to integrate Army aviation into planning and execution (Figure C-21). Army aviation focuses on the routes, FAAs, holding areas, air check points, and battle positions to synchronize A²C². Synchronization enhances the combat power of the total force by preventing duplicate efforts; thus the enemy in EA PAD can be destroyed.

ELE- MENT	OBJECTIVE/FOCUS	WHO	HOW	WHEN	INTERACTION/ CONNECTIVITY
G2 Intel	Intelligence exchange and coordination	Corps/Div G2 MI Bde, Corps MI Bn, Div	Select correct sensors Employ properly at correct time	Constant	Intel system—all levels
		G2 BCE USAF	AI ATOC/Corps HQ	Constant	JFACC & Army requirements
Weather		All	MSE	Constant and when required	All air & ground
G3 Plans Ops	Synchronize scheme of maneuver with air campaign	BCE	Locate with USAF — TACC/ATOC	Constant	Air & ground maneuver all levels
FSE	Effective, timely, and accurate artillery fires	G3 A ² C ² BCE FSE	MSE, LO	As required	All air & ground units in area of operations
Army Aviation	Routes/alt from corps rear to FAA Routes/alt from FAAs to EA and return HAs, ACPs, BPs	A ² C ² BCE FSE	Info from unit Info to USAF Info to BCE/A ² C ²	H-24	Complete air & ground connection to affected units
G4	Synchronize large fuel and ammo requirements Accelerate parts and supply related to aircraft repair			H-96 (starts)	
USAF	BAI/AI targets Airspace	w/BCE G3 A ² C ²	MSE LO	Constant/ATO (ACO) cycle	All air & ground

Figure C-21. Synchronization

(e) The corps A²C² element coordinates, integrates, and regulates the corps airspace. For the cross-FLOT operation, the aviation brigade commander must coordinate employment of his assets according to the airspace command and control plan. To prevent engagement of his friendly AD forces, the commander must exploit the existing C³ structure. He must also require his forces to adhere to directed control measures (Figure C-22).

(f) EA PAD has been designated a high-intensity airspace control zone, which is controlled by corps. The attack group has received a special corridor from the corps rear area to the BPs near EA PAD. This special corridor is large enough for the aviation group's air corridors. Restricted operating zones have been established for SLAR and Guardrail to support aviation deep operations. The BCE has planned BAI ROZ scheduled to be implemented after the aviation deep operation.

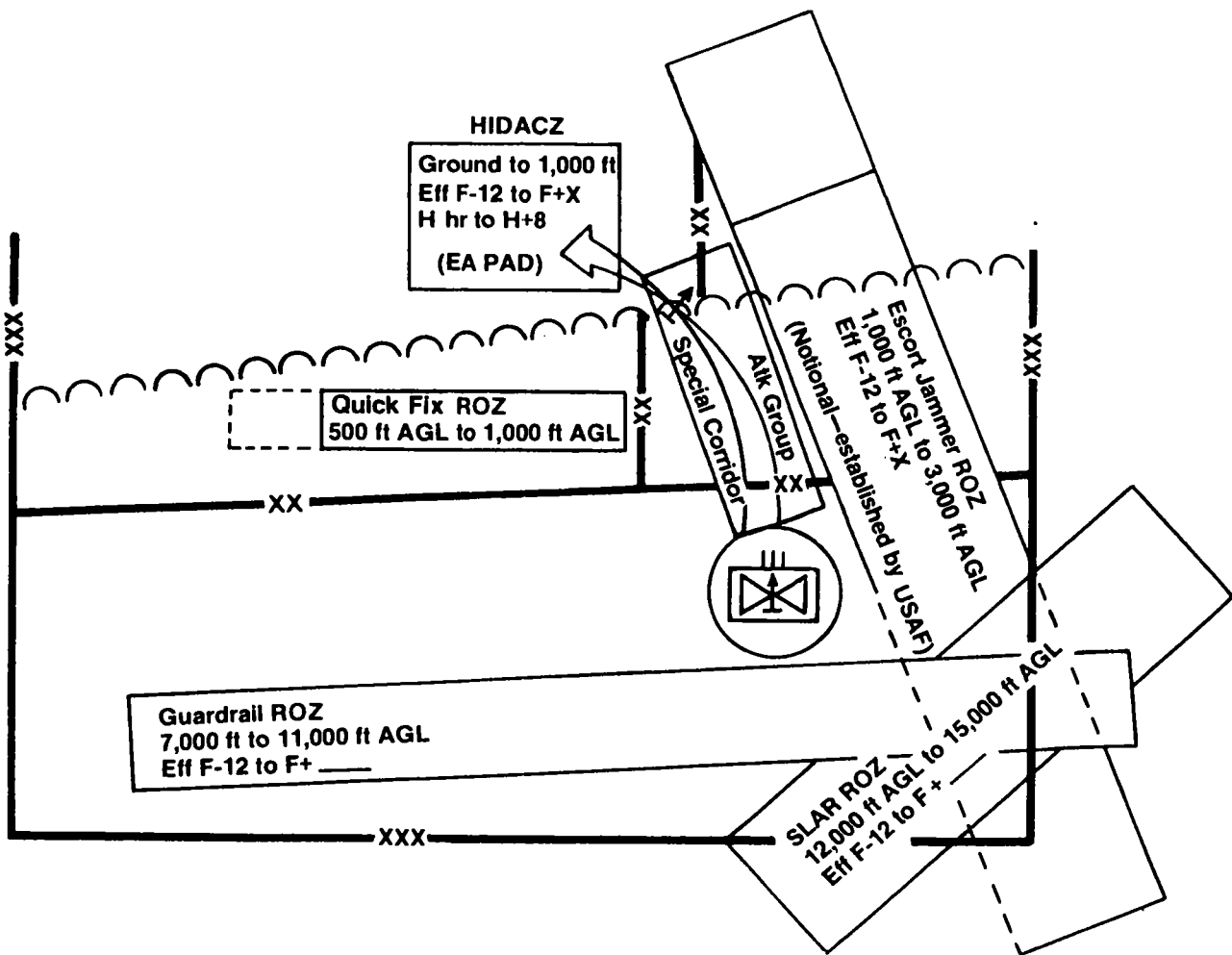


Figure C-22. A²C² plan

(g) Figure C-23 shows the aviation brigade's airspace for the deep attack. EA PAD ROZ has an attached BAI box. BAI is to be implemented after the aviation deep attack ends. SEAD targets have been designated as airspace coordination areas to keep the aircraft from overflying probable impact areas. An airspace coordination area has been established around the downed aircrew pickup point. The area protects aircrews and rescue personnel from friendly fires. The AD weapons control status in the special corridor is "weapons hold." These control measures will ensure that air and ground maneuver forces are synchronized.

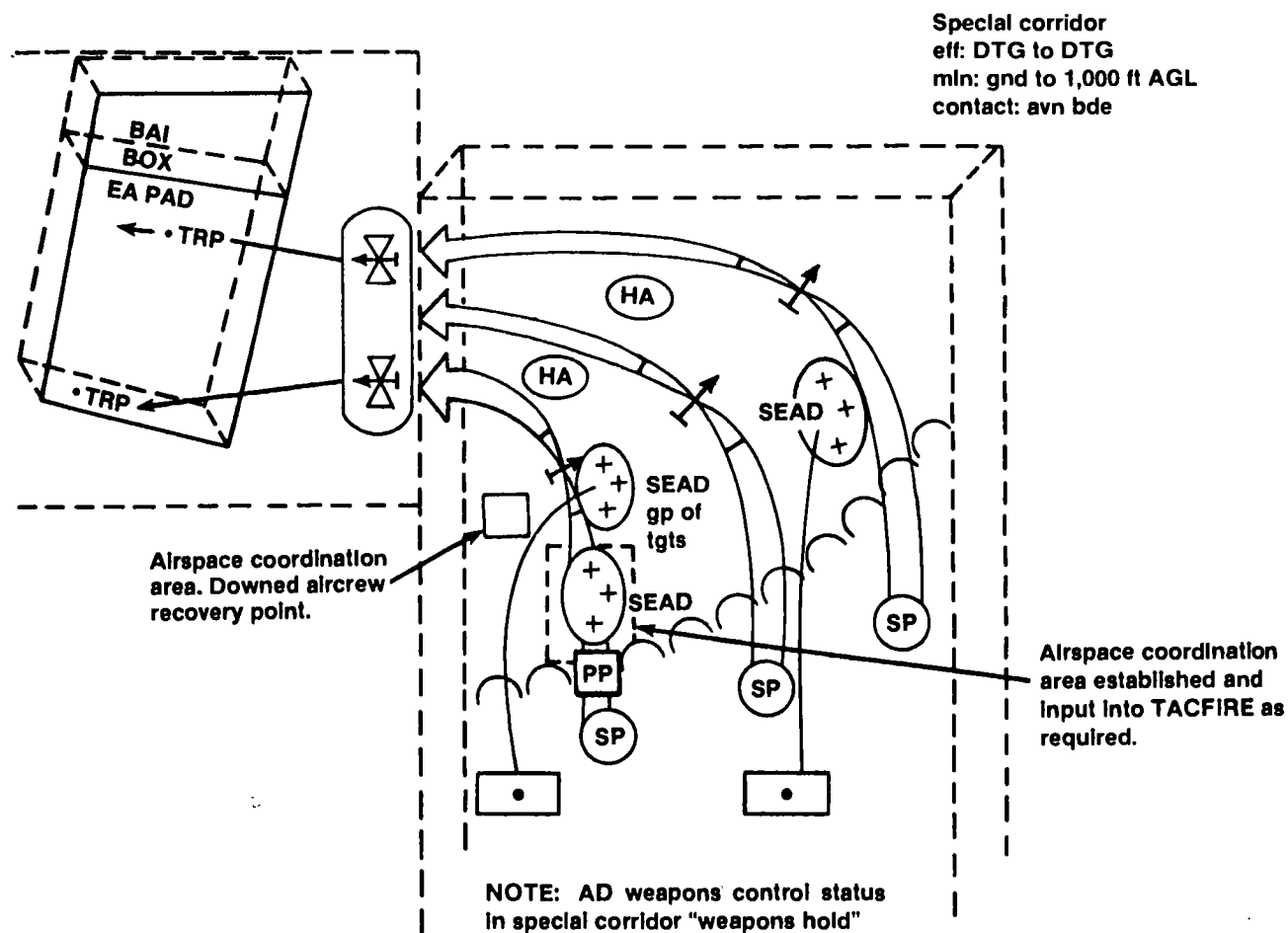


Figure C-23. Control measures

(7) Execution matrix. An execution matrix is established to synchronize execution. It includes intelligence; aviation maneuver; fires; USAF; and command, control, and communications. The matrix includes the time line in relation to the decision support template and cross-FLOT penetration (F hour). It also includes such key events as identifying the tank division at the NAI and implementing the event sequence. The anticipated attack window begins at EENT (1900). It ends at 0300 with ATKHBs returning by BMNT (Figure C-24).

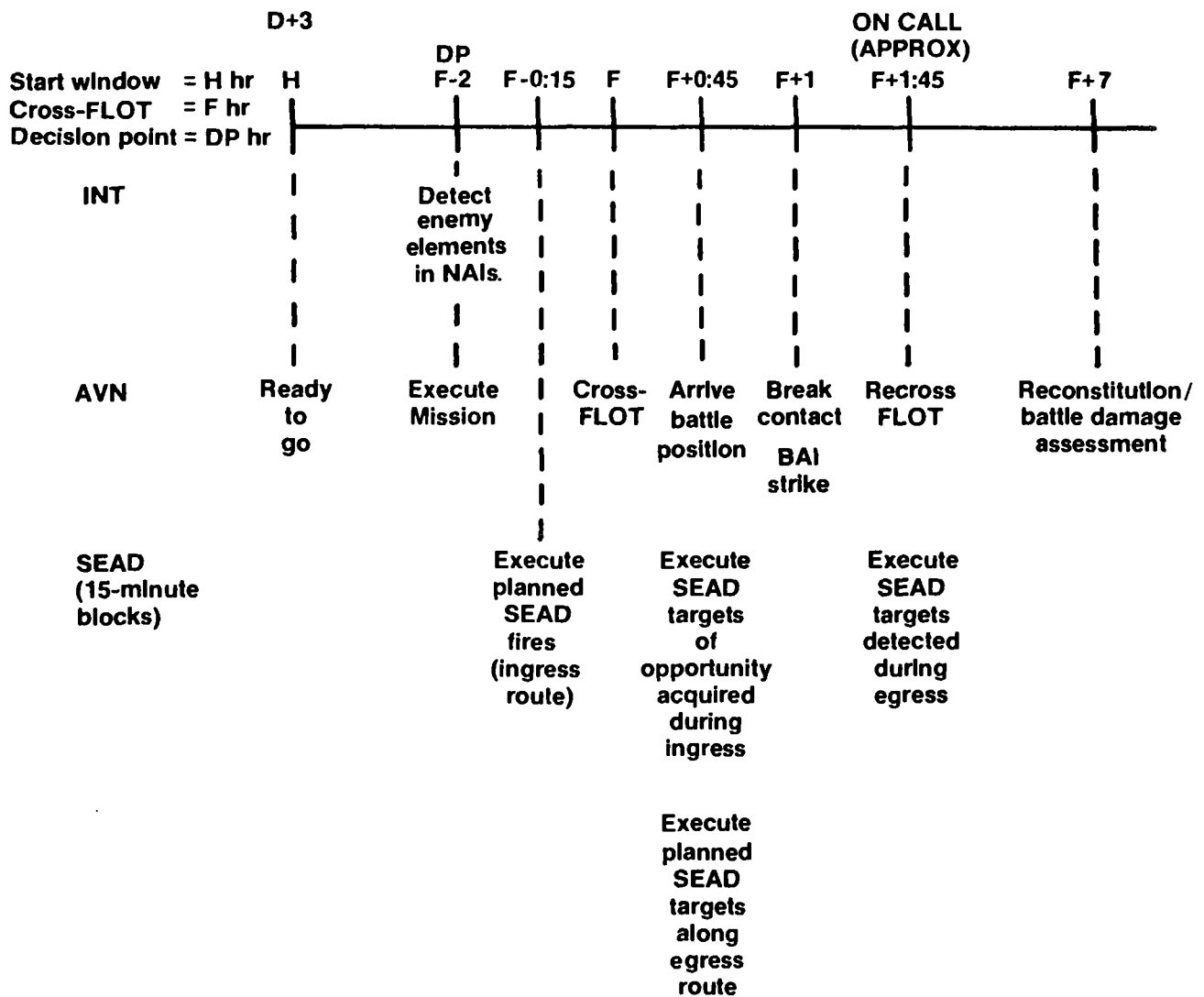


Figure C-24. Event sequence EENT through BMNT

(8) Assessment of new and additional PIR against current PIR. The G2 section--ASPS and CM&D--continue the IPB. The situation is further developed. At the same time, the isolation of high-payoff targets is assessed; also, collection tasks are finalized for corps and division assets (Figure C-25).

ASSESS NEW PIR AGAINST CURRENT PIR

Identification of newly located AD units
 Identification of new units in corps area
 Current loc/acty of tank div

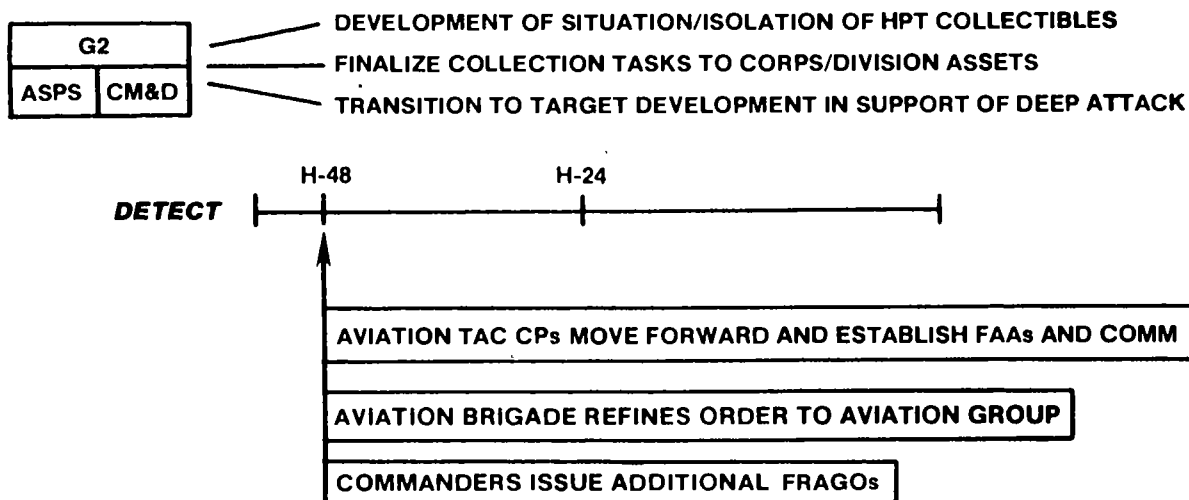


Figure C-25. Event sequence

(a) Target development continues in support of the deep attack. At about H-48, the aviation group tactical CP moves forward and establishes communications. The movement of the tactical CP should occur at night. The final aviation brigade order is also issued to the attack helicopter regiment. Detailed FRAGOs follow; updates are provided.

(b) The collection plan is revised at about H-24. This revision is based on the chosen course of action and high-payoff target list. The drive to target acquisition begins. Specific targets are focused on; target locations are refined that are within the tolerance of weapon systems to be used against each specific target. A matrix is developed to support the coordination and execution of SEAD. The matrix will also support the deep attack of the tank division. The matrix is reviewed by the corps G2 (CM&D section). Figure C-26 shows an example of a target matrix.

(c) The collection plan must support both target development and acquisition and situation development. Agencies must be tasked and sensors requested to support this plan. Then new SORs are developed and sent out to the agencies listed in Figure C-27. Sensors and processors are focused electronically or physically; these begin to isolate targets in time and space. The analysis effort concentrates on targets on the HPT list.

DESCRIPTION	WHEN	HOW	BDA	REMARKS
SA 6/8	F-0:15	FS/EW		Coord attack with avn bde
SA 9/13	F-0:15	FS/EW		Coord attack with avn bde
SA 11/12	Immediately	FS/EW/USAF		
ZSU 23-4/2S6	F-0:15	FS/EW		Coord attack with avn bde
Tank div	F+0:45 to F+1:00	Aviation	X	In/along TAI

FS = MLRS/ATACMS Bk 1
 EW = Army/USAF jammers
 AVN = Army aviation

Figure C-26. Example of a target matrix

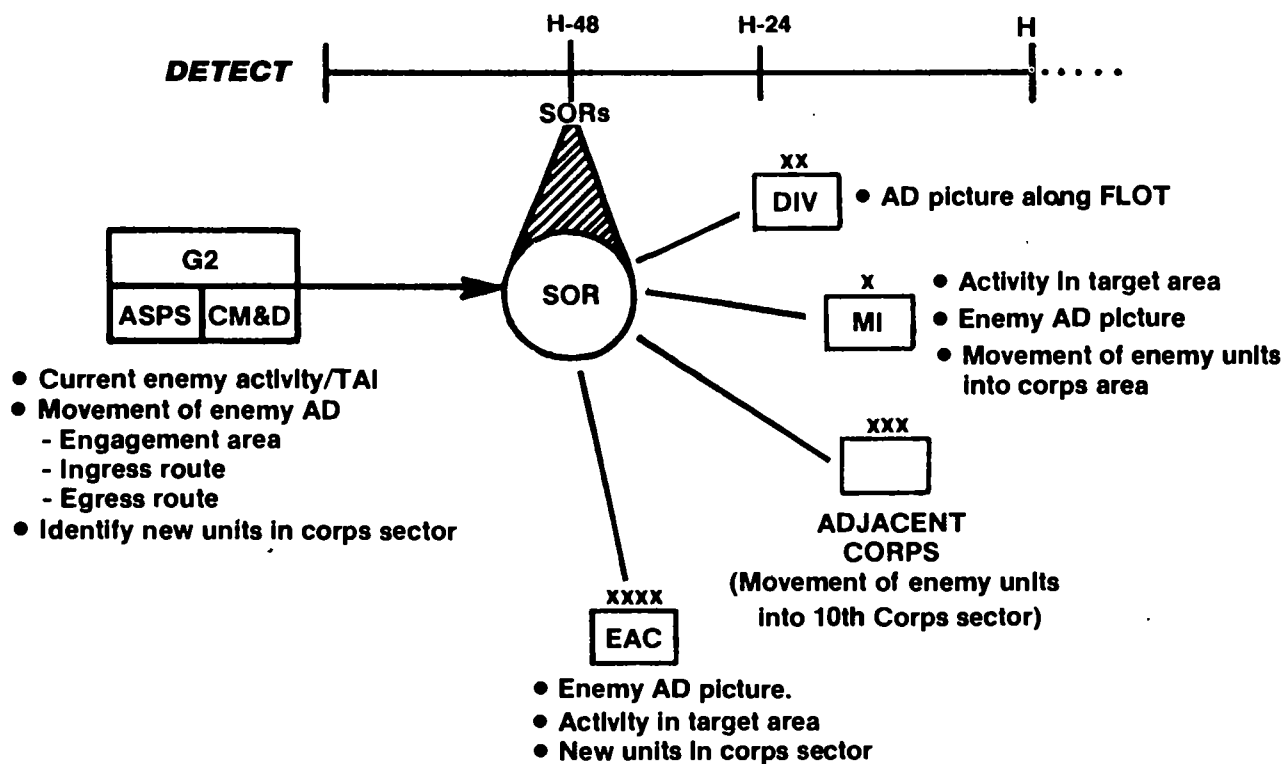


Figure C-27. New tasking implementation

(d) The aviation brigade requires substantial logistical base augmentation, especially in fuel and munitions, to sustain combat operations. All aviation maintenance and support functions must be tailored to support aviation deployments and operations.

(e) While in the corps rear area, the GS maintenance battalion, aviation maintenance battalion, and contact teams provide continuous support on an area basis (Figure C-28). During the deep attack preparation phase, a portion of each support element moves forward with the aviation elements. Corps planners must coordinate the space for support elements in the division rear area.

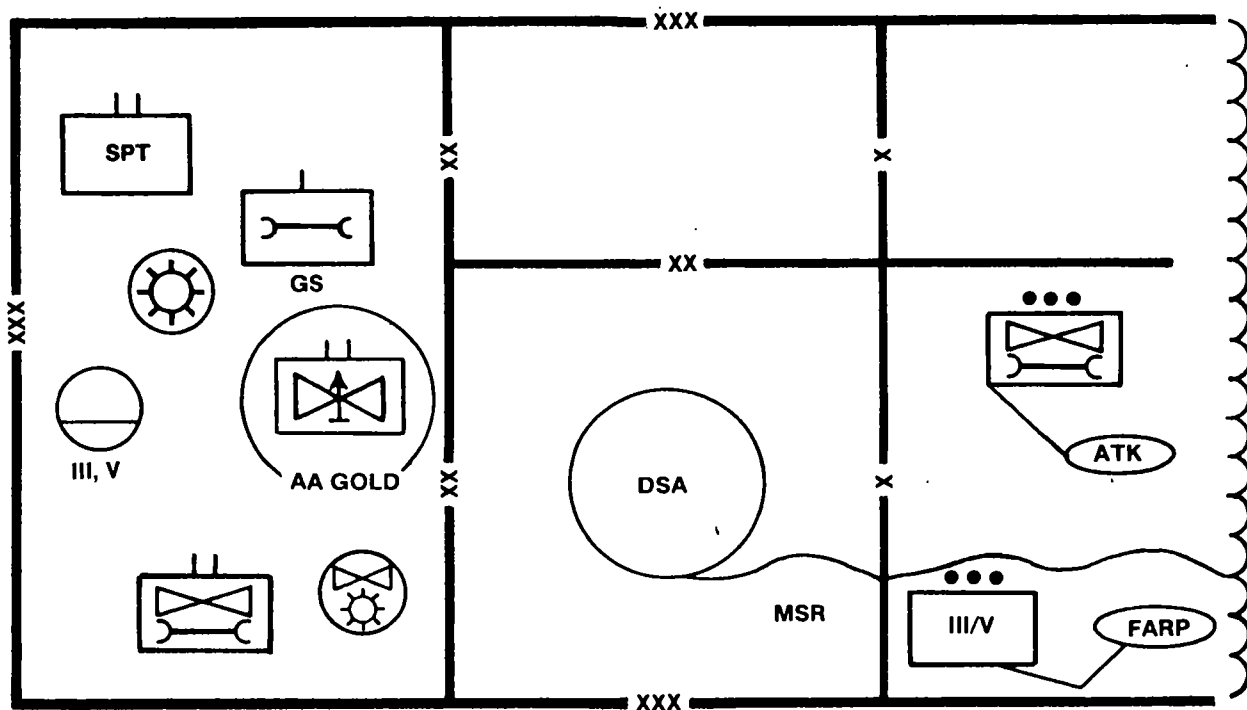


Figure C-28. Aviation sustainment preparation

(f) As H hour approaches, CS and CSS elements move to their designated locations. Intelligence units position to support the deep attack. Sensors identified are on-station as the sequence begins. The aviation brigade and the FSE receive final updates to revise the SEAD plan.

(g) The preparation phase closes at H hour; the ATKHBs will be in their FAA positions (Figure C-29). The aircraft will turn off their IFF transponders as they cross the IFF OFF line. (This line is established by the airspace command and control element after coordination with the ASOC and other activities.) The attack helicopter group tactical CP locates near the ground brigade main CP. This proximity enhances terrain management and

ultimately the forward and rearward aerial passage of lines. Air defense weapons status and artillery fires (SEAD) receive final coordination and verification. Three MLRS batteries have been moved forward to support SEAD. The ATKHB is now in the FAA awaiting the start of the F-hour sequence.

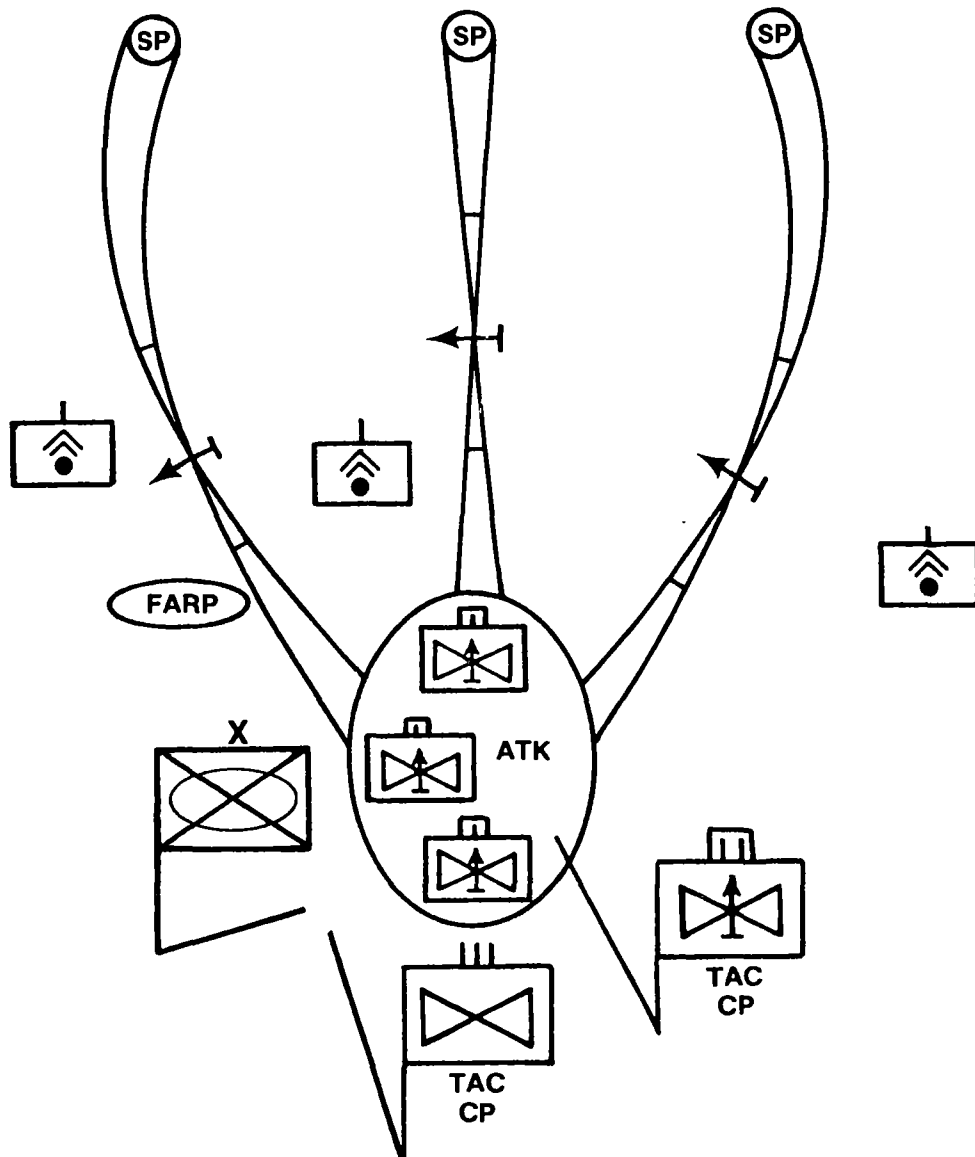


Figure C-29. H hour in position--ready-to-attack window opens

(9) Event sequence.

(a) The decision to attack is selected based on the enemy's projected rate of movement and the time anticipated for a synchronized response from the corps. The corps staff's final coordination and verification are based on actual time; this time then becomes the basis for the

attack helicopter units crossing the line of departure or the artillery units shooting their first SEAD missions.

(b) Mohawk (SLAR) and LRSU teams are expected to detect the tank regiments of the targeted tank division in the NAIs. SLAR information is relayed from the platform to the ground station module (LPU) via the onboard imagery data link; the LPU is located in the MI brigade operations center. The LRSUs relay their intelligence to the corps main CP via IHFR. Information is then relayed via landline from the G2 to the G3 (Figure C-30). Decisions are made to attack according to the event sequence based on actions at the decision points. The cross-FLOT penetration time, or F hour, is also established at this time. MSE and FM radio are among the means of disseminating orders to execute the sequenced events. The corps commander will have established checks to monitor and control units executing their sequenced tasks. The penetration of the FLOT by the aviation group is now two hours away.

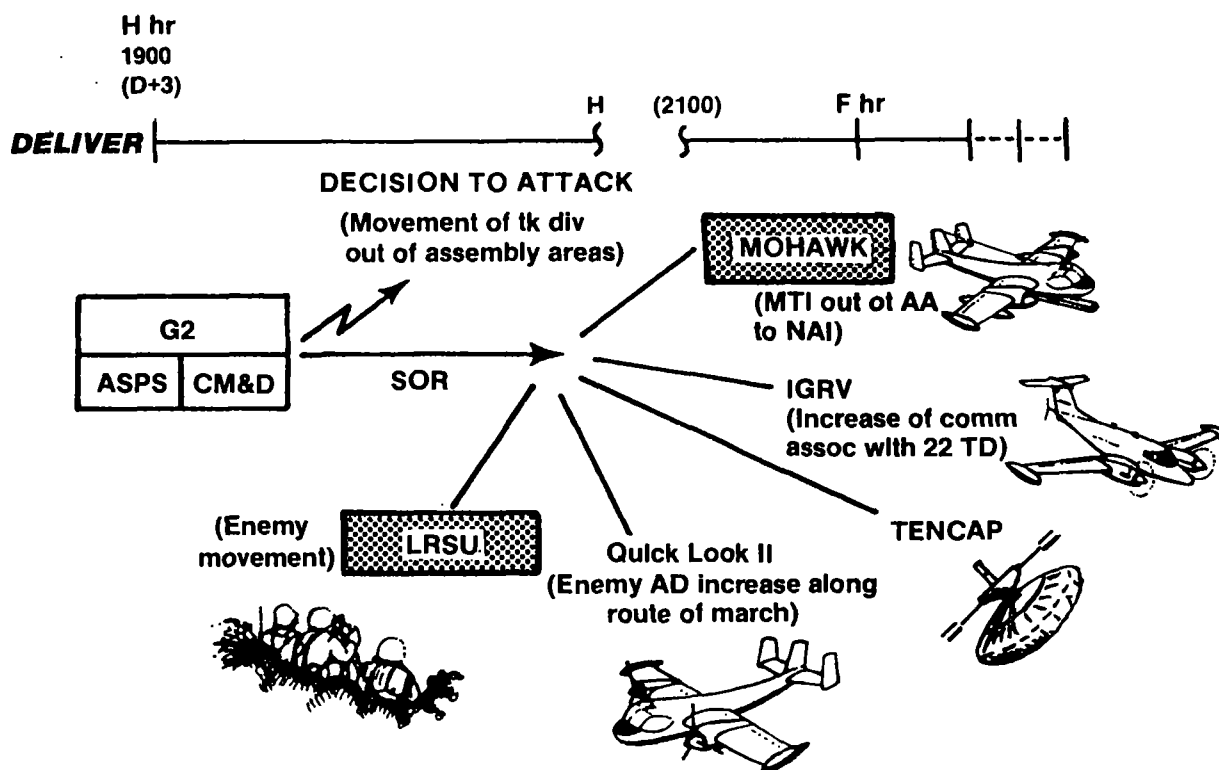


Figure C-30. Event sequence

b. Penetration.

(1) An aviation cross-FLOT operation is a combined arms maneuver mission; it requires the support of all arms. All corps units involved with the battle must participate in planning and coordination to preclude

fratricide. The corps must coordinate the passage points with the division to expedite the passage of lines. This operation requires a plan for a series of fires integrated into a strict time sequence. This sequence includes multiple crossing points, a ground feint, and an aerial ruse at the crossing site to divert enemy radar and attention. The fire support plan for this operation is planned in detail to assist in crossing the FLOT. The fires should be scheduled so that they begin before forces cross the FLOT and end before the lead aircraft arrives at the FLOT; the COMJAM should end as aviation units leave friendly artillery range. ELINT jamming continues until the aviation unit returns. Aviation planning requires tactical maps that reflect mission graphics, to include--

- Times.
- Routes.
- Hazards.
- Headings.
- Distance.
- Airspeed.
- Altitudes.
- Doppler way point.
- Known or suspected enemy locations.

Route separation considerations should include the separation of company flight paths by as much as 3 to 5 kilometers. This separation improves survivability; a single threat system is thus less likely to acquire and destroy the entire attack force. A holding area short of the FLOT is planned in case the operation is delayed after attack companies depart the assembly area. A²C² may require that all cross-FLOT routes be combined into one corridor.

(2) Key strengths of the AH-64 ATKHB are the speed, mobility, and capability to operate in darkness and in low visibility. All of these enhance the battalion's survivability. They also improve its prospects of maintaining stealth and surprise. Route planning, both forward and behind the FLOT, is based on terrain that limits the enemy's direct fire potential and conceals aircraft from electronic, radar, and visual acquisition. Doppler is the key navigational aid in the AH-64. However, it must be updated constantly using known terrain points. To compensate for this deficiency, the pilot uses map and compass information.

(3) Use of the OH-58C is limited; it lacks suitable night, weather, and targeting systems. It also is unable to keep pace with the AH-64. However, the OH-58C may perform important functions to support crossing the FLOT. First, it can conduct liaison with ground units and other supporting elements. Second, it can conduct reconnaissance and security of

the routes to and from the FLOT. Third, it can coordinate the FARP location. The scout aircraft may go forward early; or it may lead the attack force to FLOT passage points. At F-15 minutes, as the SEAD operation begins, the attack companies move forward from the FAA to identify the passage points. OH-58C aircrews coordinate the forward and rearward passage of lines. They ensure that the passage point location is correct. They also ensure that the local AD fire control status has been adjusted for the passage of friendly aircraft. The aircrews establish physical contact with the unit on the ground near the passage point; they inform the unit of the time that aircraft should arrive and how many aircraft are coming. The passage point teams may even give a visual signal to the AH-64s as they pass through the FLOT; this signal provides a known point on the ground for a Doppler update. The OH-58C aircraft must not give away the locations of passage points.

(4) As the aviation unit prepares to cross the FLOT, the aviation brigade tactical CP receives intelligence updates; critical information will be sent over the Guardrail relay. The FSE updates the SEAD plan from constant updates on the enemy AD picture. At this time, some intelligence collection shifts to the engagement area.

(5) Scout aircraft move to the return passage points; there, they coordinate crossing of the FLOT and provide security for AH-64s, UH-60s, and OH-58Ds recrossing the FLOT. The UH-60 may be employed as an airborne tactical CP.

(6) Once past the FLOT, the attack force must execute a precise plan. Each member of the attack force must be briefed on contingencies that may arise as the tactical situation changes. Speed is essential as the AH-64s penetrate the FLOT and proceed forward to the engagement areas. Avoidance or rapid suppression of enemy fires and continued movement to the objective area are key to mission timing and synchronized arrival into battle positions as the enemy enters the engagement area. The degree of separation between aircraft is normally a decision based on visibility and terrain.

(7) The speed and altitude used by attack helicopters are related to the threat, weather, and terrain. Figure C-31 depicts the action associated with the penetration. The lead company or troop may be required to immediately suppress enemy systems that threaten the force while en route to the objective. Another option is for the OH-58D to initiate fire requests via TACFIRE to the firing artillery unit. Once out of TACFIRE digital communication range, the FSO (UH-60) passes fire missions via voice FM or UHF (Guardrail) to the CTOC. At the CTOC, the FAIO will ensure that no conflict occurs between maneuver unit movement and artillery fires passed to firing artillery units.

c. Movement to the Objective. During the movement to the objective, intelligence updates the AD picture as the aviation attack continues. AD concentrations or significant changes are reported to the attacking units over the Guardrail relay. Current activity of the tank division is also reported over the Guardrail relay.

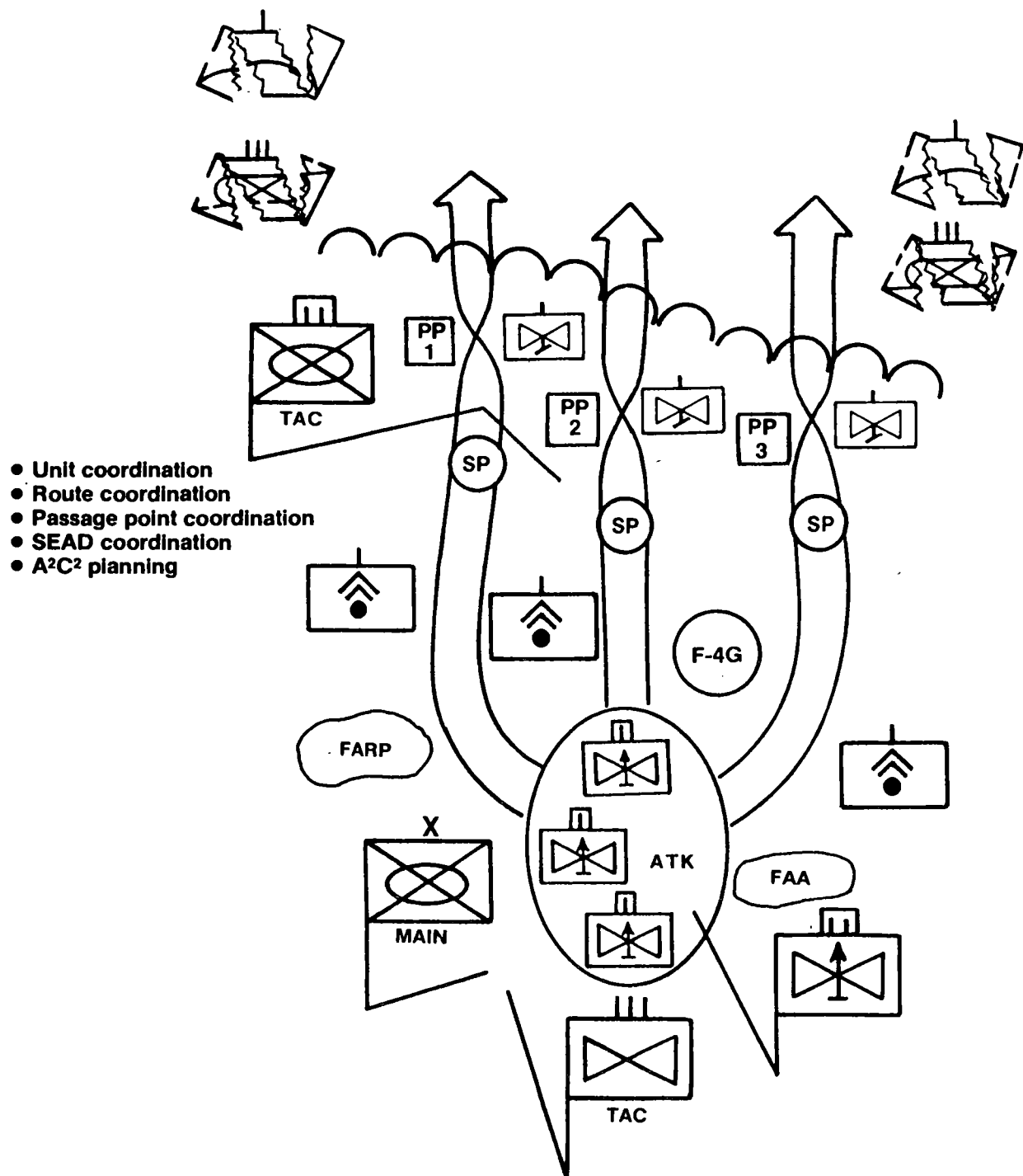


Figure C-31. Penetration phase

(1) The light attack team will reconnoiter the route holding areas and battle positions. Then it will maneuver to forward battle positions so that it can visually acquire and identify targets (Figure C-32).

FSC

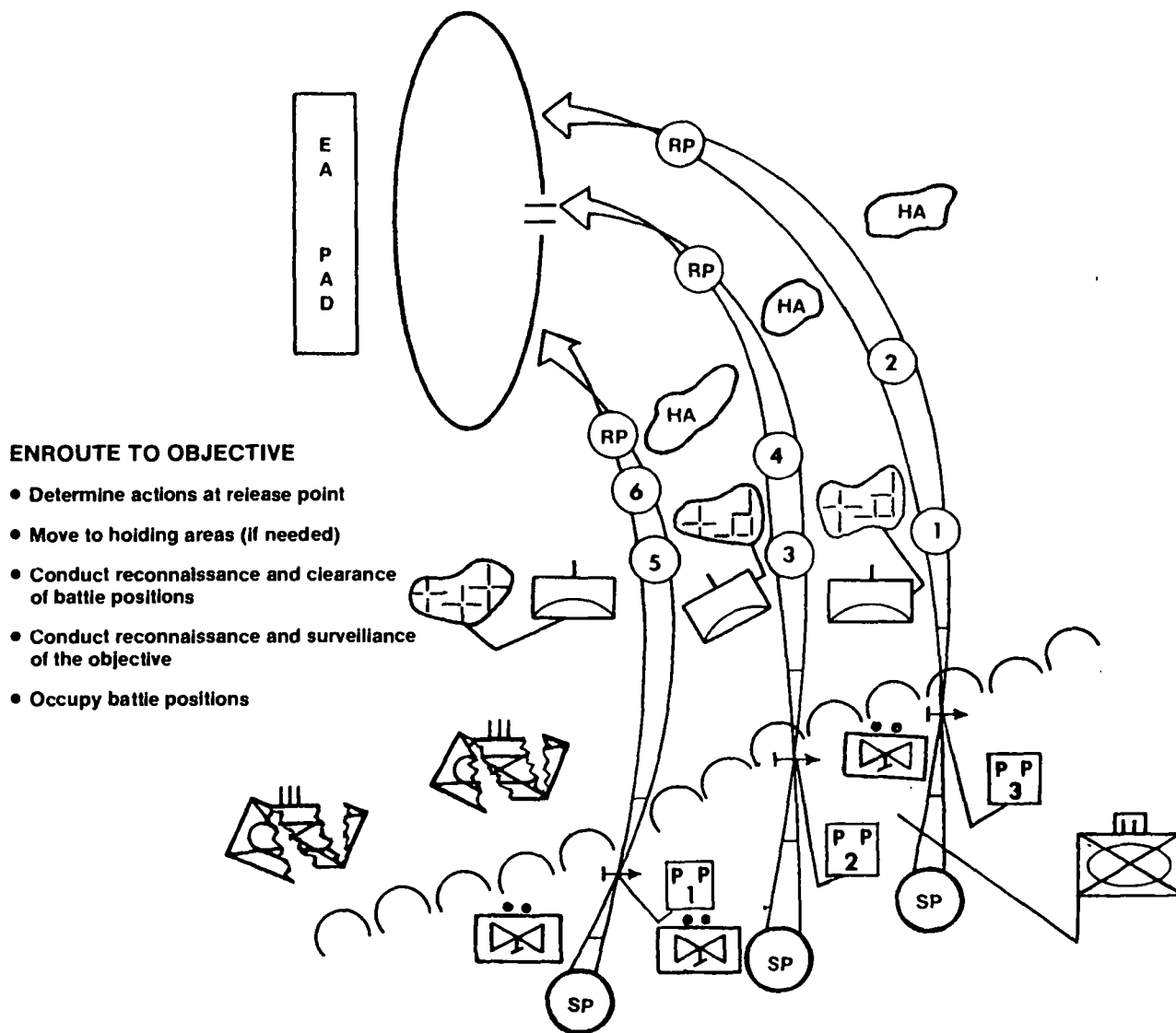


Figure C-32. Attack helicopter battalion's movement to EA PAD

(2) The attack helicopters will engage targets from concealed battle positions that are designated in the operation order. BPs are selected in relation to the engagement area from a careful map study and kill zone

analysis. Mutual support, overlapping coverage, and the laser-to-target line are primary considerations. In deep operations, the occupation of battle positions may be difficult because they have not been reconnoitered and secured. How the AH-64 disperses within a BP is terrain-dependent. BPs have to be adjusted significantly to obtain optimum fires on targets. The BP must be secured while it is occupied. Crews are assigned sectors of responsibility for periodic air and ground sweeps. Regular scans will help to prevent an enemy surprise attack from a blind side. If the tactical situation dictates, a portion of the force may be totally dedicated to the security mission.

d. Actions at the Objective.

(1) Intelligence collection at the objective. As the aviation unit arrives at the objective, all sensors report current activity in the objective area.

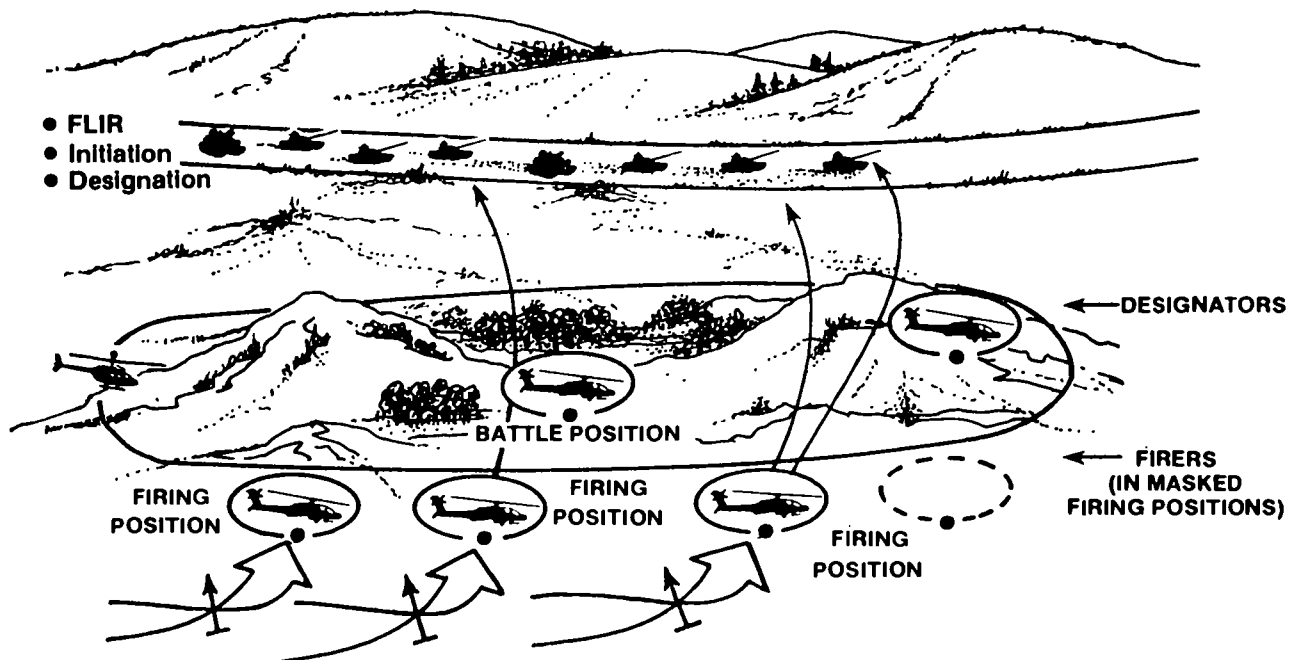
(2) Target engagements. The engagement is best begun by using heavy team AH-64 remote fires. These fires optimize surprise, confuse the enemy, and allow the commander to better assess the target array. The light team designators may then fire autonomously; they use complementary engagement techniques to suppress enemy ADA. If surprise is achieved and a target-rich environment is observed, the company commander should consider moving the heavy team forward; then he can direct all aircraft to engage autonomously to further reduce total engagement time.

(3) Fire distribution and control. Well-established target engagement techniques and procedures in which personnel have been thoroughly trained result in optimum kills in the engagement area with less exposure to enemy fires. When surprise is achieved, as many targets as possible should be rapidly developed in the assigned order of priority. To prevent multiple shots on the same target, each battalion TF must adhere to the fire distribution plan (Figure C-33). The EAs should be broken down into smaller kill zones for pre-positioning the TADS; battalion or company boundaries should follow or cross an easily identifiable terrain feature (Figure C-34). Each company will be assigned a company kill zone; this zone will, in turn, be divided into smaller areas for each attack helicopter. Essentially, the left shoots left, the right shoots right, and the center shoots center.

e. Return. While the attack unit engages the target, intelligence collection begins to shift to the egress route. Locations of enemy AD radars that have been illuminated during the attack will be passed to the FSE to update the SEAD plan. Any new concentrations of enemy AD will be reported to attacking units.

(1) Withdrawal from the objective. As the heavy team reports "ordnance expended," the light team provides massed rocket fires to allow the attack force to break contact with the enemy. The light force will be loaded mainly with a mix of high-explosive, white phosphorous, and multipurpose submunitions and Hydra-70 rockets.

TARGET ACQUISITION AND ENGAGEMENT



FIRE DISTRIBUTION AND CONTROL

- SOPs
- Graphics
- Laser designator
- Unit intervals

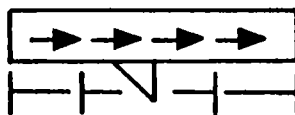


Figure C-33. Target acquisition and engagement and fire distribution and control

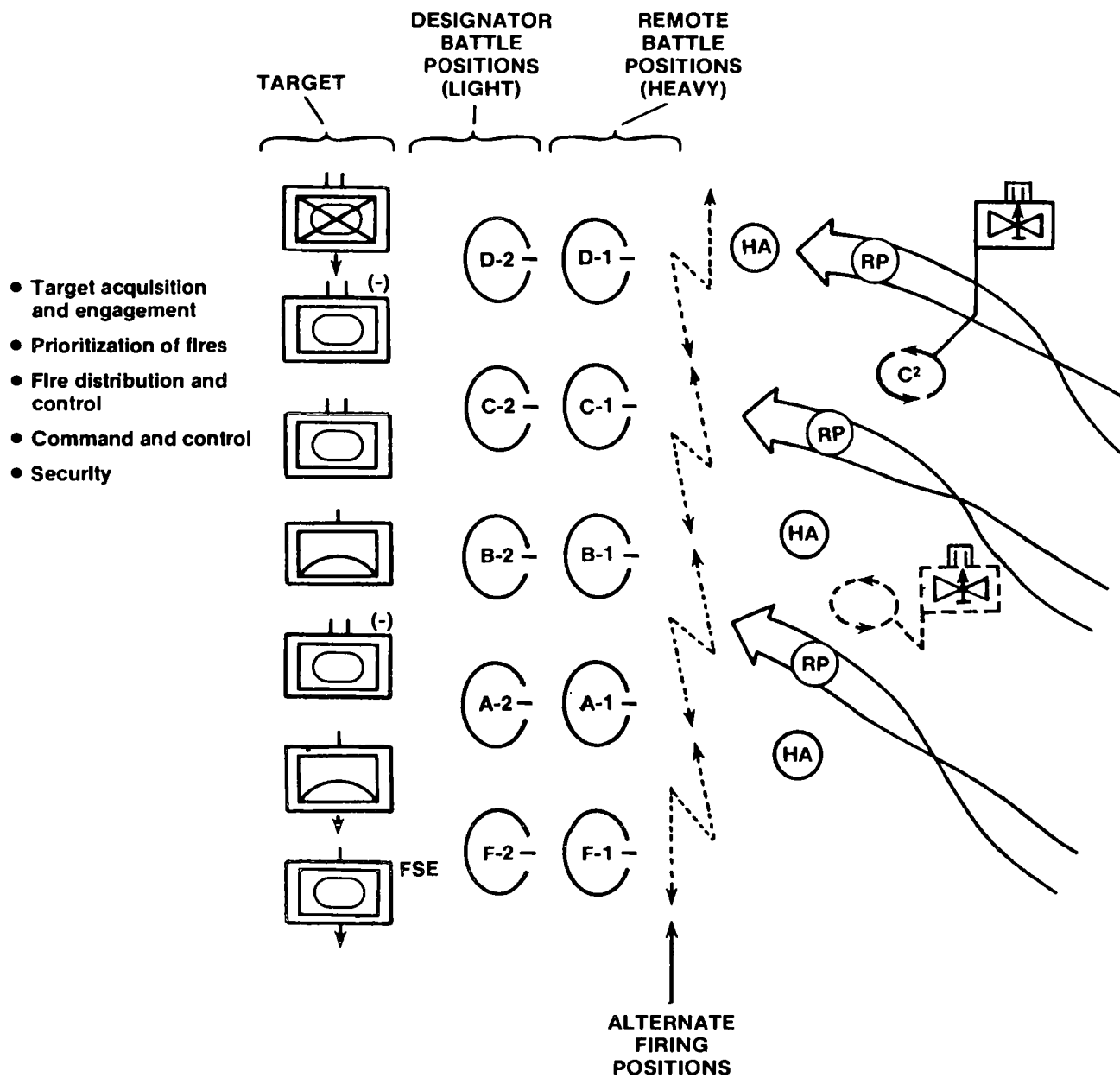
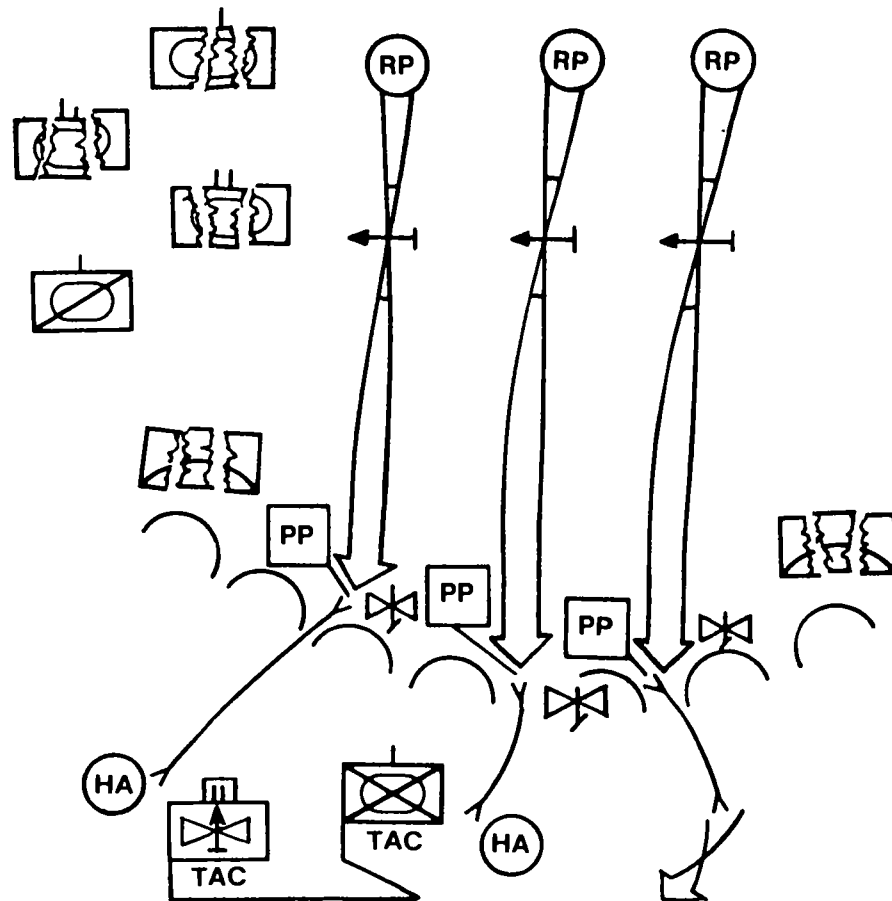


Figure C-34. Actions at the objective

(2) Return route and rearward passage of lines. Return to and reentry through the FLOT (Figure C-35) differ chiefly in the selection and use of different egress routes and the use of onboard ASE. The corps must now coordinate the passage of lines by changing the AD weapons status of the

- **Withdrawal from the objective**
- **Return phase**
- **Rearward passage of lines**



(3) Battlefield damage assessment. The LRSU starts the BDA as soon as the return phase begins. Sensors obtain intelligence for the corps to estimate the enemy's combat effectiveness. They also provide probable courses of action and a window of opportunity for friendly maneuver deep fires.

C-39

(1) The attack helicopters perform postflight checks. These checks determine whether aircraft need repair before they are sent from the FAA to the corps rear area. The entire battalion staff will be involved in the recovery. The battalion quickly moves back to the assembly area in the corps rear area where CSS can be focused on the battalion. The ATKHB will require 24 to 48 hours to prepare for another deep operation (Figure C-36).

(2) All available sensors turn to BDA. They determine the results of the attack and the enemy commander's reaction. Combat effectiveness of the 22d GTD must be ascertained. Thus the corps planning staff will know the options the enemy army commander now has; for example, committing the 22d GTD as is, reconstituting and continuing the attack, or forcing an early commitment of an element of the 25th Tank Army. The attack on the 22d GTD starts the planning cycle again; the attack and its effect on the corps commander's campaign plan must be evaluated.

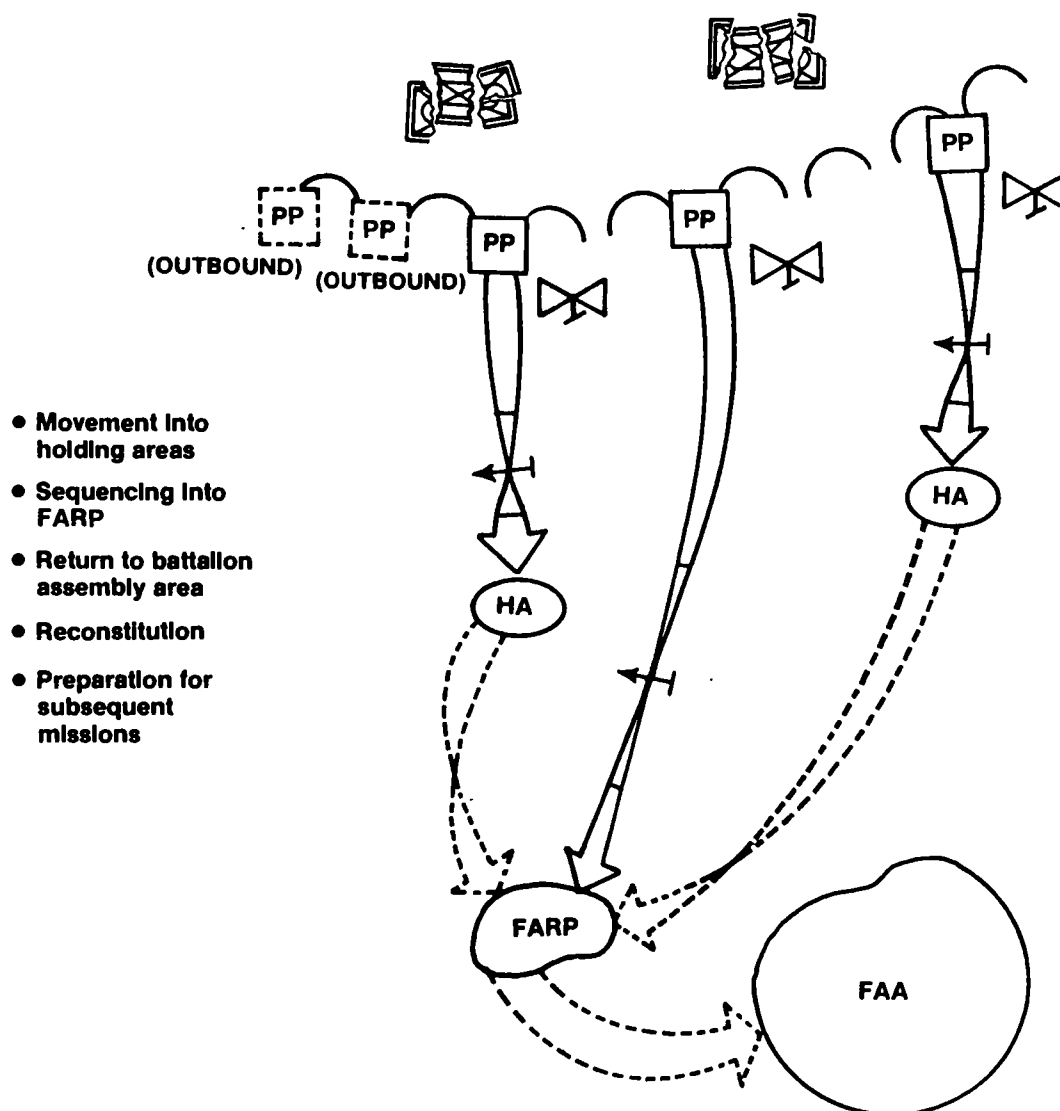


Figure C-36. Reconstitution

Appendix D

NBC OPERATIONS

This appendix implements STANAG 2889, QSTAG 742, and STANAG 3497.

The ATKHB may expect to conduct all or part of its operations in an NBC environment. To accomplish the mission, the ATKHB commander must prepare his soldiers to fight and win in an NBC environment. He must train his soldiers to exploit friendly nuclear strikes or retaliatory chemical strikes once the enemy employs NBC weapons. This appendix serves as a guide for planning purposes by which the ATKHB commander and his staff may employ his battalion in an NBC environment.

Section I

NBC THREAT

D-1. THREAT DOCTRINE AND PREPAREDNESS

a. The NBC threat can exist anywhere. However, ATKHB commanders must focus on the Soviet Union and Warsaw Pact countries as the most formidable NBC threat. Threat employment doctrine stresses offensive operations and a willingness to use nuclear and chemical weapons to win. Threat leaders know these NBC weapons may alter tactics, advance rates, force and power ratios, and logistics. The Threat can produce and stockpile NBC weapons and employ them with a variety of delivery systems.

b. The Soviets classify nuclear and chemical weapons as weapons of mass destruction when relating them to company protective measures. However, they consider chemical weapons as conventional when relating them to employment doctrine. The Soviets have many options for employing nuclear and chemical weapons. Thus any future conflict involving the Soviets should be considered likely to include the employment of NBC weapons.

c. The Soviets have developed and fielded a large inventory of defensive equipment, and they have well-trained chemical personnel. As part of their overall preparedness, the Soviets conduct extensive, realistic training. However, NBC warfare will impose the same constraints on Soviet soldiers as it will on US soldiers. Individual protective clothing and psychological factors will also degrade the performance of both Soviet and US soldiers in an NBC environment.

D-2. NUCLEAR WARFARE

a. The Soviet Union has a wide range of systems that can deliver nuclear weapons. As illustrated in Figure D-1, no area on the battlefield is free from the threat of a nuclear strike. The Soviets have stated priorities for nuclear strikes. They include the following in order of priority:

- Enemy nuclear delivery means, aircraft, field artillery, missiles, and rockets.
- Airfields.
- Division and higher level headquarters.
- Defensive positions.
- Reserves and troop concentrations.
- Supply installations, especially nuclear ammunition storage points.
- Command, control, and communication systems.

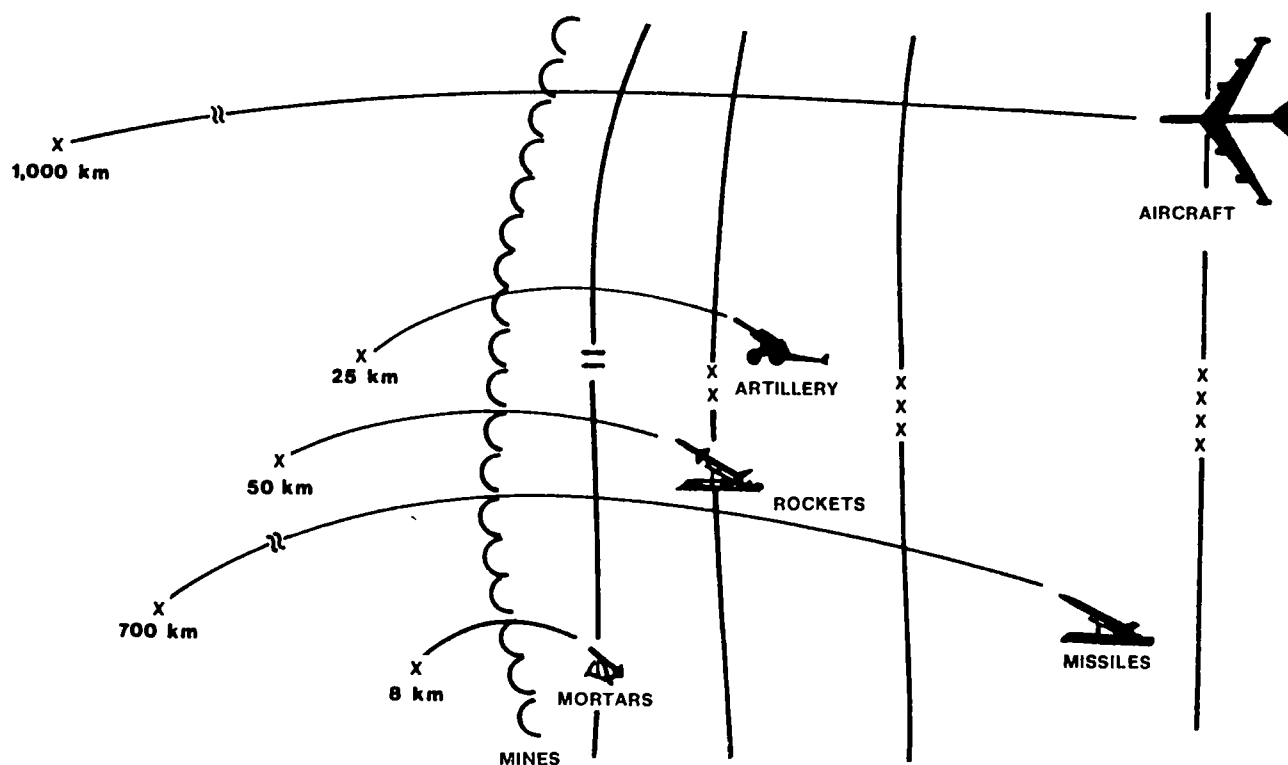


Figure D-1. Range of Threat delivery systems

b. Battalion elements are not directly targeted for a nuclear strike. However, the battalion's mission may place battalion elements in an area where they would become a target for nuclear weapons.

D-3. BIOLOGICAL WARFARE

a. Biological warfare is the intentional use of organisms to cause death or disease in personnel, animals, or plants. Examples of these living organisms, called pathogens or germs, bacteria, rickettsiae, viruses, and fungi. Germs can be dispersed by artillery, rockets, aircraft, sprays, vectors, or covert operations. The possibility of biological warfare exists even though treaties prohibit it. The policy of the United States is to never engage in biological warfare.

b. The US defines a biological agent as any living organism or toxin produced by an organism that can incapacitate, seriously injure, or kill personnel. The Threat considers toxins to be chemical agents. The agents covered by biological treaties are bacteriological agents.

D-4. CHEMICAL WARFARE

a. The Soviets classify chemical agents in six major types: nerve, blood, blister, choking, psychochemical, and irritant. The United States classifies chemical agents by physiological categories: nerve, blood, blister, choking, incapacitating, and riot-control agents. In a nuclear war, chemicals may be used to complement nuclear weapons. Normally, chemicals would be employed after a strike when protective equipment has been damaged and personnel are physiologically weak. A combination of agents can be used to confuse medical treatment or to compound the effects of individual chemical agents. FM 8-9 describes the effect agents have on the human body. Chemicals do not require pinpoint targeting because of the potential for contamination of a wide area downwind of the attack.

b. Soviet targeting priorities for chemical agent attack are nearly identical to Soviet priorities for nuclear strikes. The Soviets may target airfield and rear area lines of communication to disrupt US resupply and reinforcement operations. However, they might keep these points intact for subsequent use by their forces. The Soviets may target frontline troops, such as the ATKHB, with nonpersistent agents. The Soviets may also target US or allied flanks and rear areas with persistent agents to act as obstacles and to delay the retrograde of friendly forces.

Section II

NUCLEAR WEAPONS

D-5. THERMAL RADIATION EFFECTS

The energy released from a nuclear detonation interacts immediately with the surrounding air. Within nanoseconds from the time of detonation, an intense

light pulse is emitted. Also, the air is heated to thousands of degrees Centigrade, vaporizing even the unreacted bomb material. The sphere of superheated air is called the fireball. The heat and light are referred to as thermal radiation. Thermal radiation will continue to be emitted from the detonation for several seconds to tens of seconds, depending on the yield of the weapon.

a. Heat Effects.

(1) Skin burns.

(a) Unprotected or exposed skin is susceptible to thermal radiation burns. These may be first-, second-, or third-degree burns. First-degree burns are similar to a sunburn and involve injury to the epidermis. In second-degree burns, the epidermal layer is destroyed but some viable tissue remains. These burns usually form blisters. In third-degree burns, the thick epidermis and underlying layer, or dermis, are destroyed. These burns have a dark brown or charred appearance.

(b) The severity of the burns depends on the yield of the weapon, proximity of personnel to ground zero, and level of individual protection. For example, unprotected skin would receive third-degree burns from a 1-kiloton explosion at 600 meters, second-degree burns at 800 meters, and first-degree burns at 1,100 meters. The chance of severe burns can be reduced if personnel wear clothing that does not leave the skin exposed. Nomex flight suits somewhat protect aircrews from skin burns.

(2) Materiel damages. Thermal radiation is hazardous to ground support equipment and supplies as well as personnel. JP8 stored in blivets is especially vulnerable. The black rubber in the blivets will absorb thermal radiation and may become heated and hardened. In addition, the blast may cause the blivets to leak because of punctures or stresses. Burning rubber, leaves, or grass might ignite the fuel, causing explosions and fires. Personnel (fuel handlers) at FARPs must take measures to protect the blivets such as burying them or covering them with tarps.

(3) Fires. The heat from thermal radiation may cause fire storms in forests and urban areas. These fires may affect aviation units directly if they are in the path of the storm. Fires will affect aviation units indirectly if they are used to evacuate ground units. Ground personnel may be unable to evacuate such areas with their ground transportation assets because of obstacles such as fallen trees.

b. Light Effects.

(1) Flash blindness.

(a) The retina may receive more visible light from a fireball than is needed for light perception but not enough to cause permanent damage. Visual pigments of the photoreceptors bleach out, and for a brief period vision is impaired. This is called flash blindness or is sometimes referred to as dazzle. Flash blindness is more of a hazard at night than during the

day because the pupil is larger and admits more light at night. How flash blindness impacts on military operations depends on the tasks of affected personnel. The temporary loss of vision may be temporarily hazardous to ground soldiers, but it could be fatal for aircrews.

(b) The severity of flash blindness is directly related to the yield of the weapon, distance between the fireball and personnel, and atmospheric conditions. Low visibility will reduce the magnitude of the visible light pulse. In the daytime, a 1-kiloton weapon could cause flash blindness from a distance of 6 kilometers. At night, the same weapon would produce flash blindness from a distance of 51 kilometers.

(2) Retinal burns. An excessive amount of light focused on the retina can cause retinal burns. The intense light burns the photoreceptors and causes a blind spot. The damage is permanent, because photoreceptors cannot be replaced. The degree of incapacitation would vary. For example, a person looking directly at the explosion could suffer destruction of the fovea centralis and be considered functionally blind. Another person with a burn in the periphery of the retina might not be aware of the blind spot. Soldiers facing a 1-kiloton detonation could receive retinal burns from as far away as 6.7 kilometers.

D-6. BLAST EFFECTS

The rapid expansion of the fireball creates a wave of compressed air. This is referred to as a shock wave or a blast wave. The blast wave causes damage by two kinds of pressure: dynamic pressure, referred to as winds; and static overpressure, referred to as overpressure. The compressed gases produced by a nuclear explosion expand outward in all directions from the point of detonation. This wave travels at approximately the speed of sound.

a. Dynamic Pressure.

(1) Wind velocity. The wind velocity can range from a few miles per hour to hundreds of miles per hour. The velocity will depend on the yield of the weapon, height of the burst, and distance from the point of detonation. The wind velocity decreases with distance. For example, a 100-mile-per-hour wind will occur approximately 6 miles from a 1-megaton detonation, 4 miles from a 300-kiloton detonation, or 1 mile from a 5-kiloton detonation. However, when a nuclear burst first detonates, the observer will be unable to predict the wind velocity because he will not know the yield of the weapon or the location of ground zero.

(2) Drag forces. The winds cause damage by drag forces. Drag forces collapse buildings, overturn vehicles, and create missiles from flying debris such as rocks, sticks, or glass fragments. They also hurl exposed personnel against structures and solid objects and blow down trees. For nuclear weapons, the time from the initial blinding flash of light until the blast wave reaches the area can be several seconds or longer. For large-yield weapons at great distances, the time can be longer than 30 seconds. Thus personnel will have some time to seek shelter before the blast wave hits.

(3) Wind phases. Winds have a positive phase and a negative phase. During the positive phase, winds travel outward from the point of detonation. As the fireball rises, a slight vacuum is created. This will cause the winds to reverse and blow back toward the detonation. The velocities of this reverse wind are mild compared to the positive phase. The reversal of the winds will keep missiles in the air longer and possibly cause more damage. The missiles may fall back to the ground and settle after the positive phase and then be picked up again by the negative phase. Because of the turmoil, ground troops may not even notice the negative phase. Aircrews may notice it more because wind reversal will create more air instability for them to overcome.

(4) Aerodynamics. The effects of high winds on fixed- and rotary-wing aircraft have been studied in wind tunnels and in open-air testing. Nuclear blast winds have the same effects on aerodynamic surfaces and airframes as any other type of high wind. Nuclear weapons can produce enormous wind velocities, extreme turbulence, and wind shear. The length of time the winds persist is longer than that produced by conventional munitions. Rotary-wing aircraft may experience sudden yaw, pitch, roll, and lift changes. Extreme effects can include blade flapping and bending, mast bumping, loss of tail rotor effectiveness, flameout, and airframe crushing.

b. Static Overpressure.

(1) Overpressure force. The compressed gases create a force that causes the ambient air pressure to increase. This is called overpressure. A conventional high-explosive munition also has an overpressure effect, but it is not as powerful and lasts only for microseconds. The nuclear explosion creates overpressure that can be hundreds of times greater than the ambient air pressure. As with the winds, the overpressure decreases as the distance from the point of detonation increases.

(2) Aircrew injury. Wind velocity and overpressure are inter-related. For example, the wind velocity is approximately 35 miles per hour at 1 psi overpressure. At 5 psi, the winds are approximately 160 miles per hour. At overpressures of .5 and greater, windscreens begin to shatter. Flying fragments can result in injury to aircrews. At 35 miles per hour, glass fragments are not a significant hazard except to the eyes or the throat. At higher pressures, the wind velocity could cause casualties from fragments penetrating the flight suit and skin. Also, with the windscreen gone, external missiles may enter the cockpit, resulting in injuries.

(3) Airframe damage.

(a) Airframes are vulnerable to overpressure effects. Glass (Plexiglas, safety Plexiglas, or safety glass) begins to shatter at .5 to 1 psi overpressure. At .5 to 2 psi, larger windows that face the point of detonation shatter first. As the overpressure increases (2 to 5 psi), all windows will shatter. Overpressure may cause glass to implode initially. Then the positive wind phase creates missiles of the glass fragments.

(b) The overpressure initially affects only the side facing the detonation. However, the blast wave envelops the aircraft within micro-seconds, exerting forces on the opposite side as well. The sequential occurrence creates buckling and twisting forces, resulting in skin wrinkling and internal frame stresses.

(c) Light damage to the airframe, other than glass, begins to occur at 3 to 5 psi overpressure. On rotary-wing aircraft, the tail boom weakens and may undergo slight separation. Subsequent severe flight maneuvers may result in tail boom failure. On all aircraft, the fuselage and internal frames undergo substantial stresses and skin panels rupture. Longerons, stringers, and frames may fail at these pressures.

D-7. NUCLEAR RADIATION EFFECTS

Nuclear radiation consists of all types of ionizing electromagnetic and particulate radiation; specifically, alpha, beta, neutron, and gamma. FM 8-9 describes the effects of each type of radiation on the human body. Nuclear radiation travels outward in all directions from the detonation point. The effects of nuclear radiation are categorized as initial and residual.

a. Initial effects. Initial effects are those manifested within 60 seconds after detonation. They consist of all types of electromagnetic and particulate ionizing radiation. For small yields, the initial radiation will cause numerous personnel casualties. However, an aircraft flown close enough to the nuclear detonation for the aircrew to receive incapacitating dosages would probably not survive the blast damage anyway. This initial radiation remains a concern for aircrews on the ground and personnel in FARPs, AVIM units, and headquarters.

b. Residual effects. Residual effects are those that remain hazardous after 60 seconds. The most important residual effects are fallout and induced radiation or neutron-induced gamma activity.

(1) Fallout. The fireball continues to grow in size after a nuclear detonation, stabilizing within several minutes. Because hot air rises, it also gains altitude as it grows. The rising and cooling of the fireball create an area of low pressure directly beneath the fireball. If the point of detonation is close to the earth's surface, then the dirt and debris are drawn up into the fireball. Vaporized bomb material then mixes with the dirt and debris. The mixture of radiological dirt and debris, called fallout, begins to fall back to earth and may cover hundreds of kilometers as it travels downwind. Fallout can result in significant radiation dose-rate levels and communication blackouts from the large quantities of dust and debris in the atmosphere. The large particles may also cause structural damage and FOD to aircraft.

(2) Induced radiation or neutron-induced gamma activity. Neutron radiation occurs only during the initial nuclear reaction. However, neutrons can cause other elements to become radioactive. The ground directly below the point of detonation will most likely become radioactive. This induced

pattern, usually not exceeding two kilometers in diameter, will present a significant radiation hazard for ground personnel for two to five days. Routine occupancy is possible after five days. The extent of the hazard can be determined by reconnaissance or survey teams.

c. Radiation Exposure and Sickness.

(1) Radiation exposure. Radiation exposure considerations are relatively the same for aviation personnel as those for ground personnel. The ground commander establishes exposure guidelines, and NBC personnel keep track of the radiation exposure. The aviation commander has the more difficult job of determining when an aircrew becomes ineffective from radiation exposure. Table D-1 shows the biological effects of nuclear radiation. Individual response to a particular dose will vary, depending on such variables as health, previous exposure, and injury.

(2) Radiation sickness. Aviators must be alert to symptoms that impair their ability to fly. Leaders should observe their personnel closely to detect behavior that may necessitate grounding them. Initial symptoms of radiation sickness include nausea, fatigue, and listlessness that may mimic other illnesses. Flight surgeons should monitor radiation exposure and provide appropriate guidance to the commander.

D-8. ELECTROMAGNETIC PULSE

The EMP is a wave of electromagnetic energy that is produced by a nuclear detonation when gamma rays make contact with the atmosphere. It occurs immediately after nuclear detonation and travels outward in all directions. EMP presents no significant biomedical hazard to humans. However, it can damage electronic components. Because EMP is a form of electricity, it will follow the path of least resistance into electrical equipment.

a. Component and Aircraft Systems Damage.

(1) Component damage. EMP can affect any electrical component. A sudden surge of EMP will cause overvoltage, shorting out wiring and transistors. Vacuum tubes may be somewhat affected by EMP, but more energy is required to destroy them. EMP can enter through the casing of radios and destroy them. It can destroy circuitry even with radios turned off and antennas disconnected. The severity of the damage depends greatly on component design. Testing continues to determine the extent a system can be disabled by EMP damage. It should not be assumed that every electrical component will be totally destroyed by the EMP. Some components may only be temporarily disabled.

(2) Aircraft systems damage. Aircrews should know which aircraft electrical systems are critical and how failure of those systems will affect the flight. For example, some aircraft instruments may be disabled, radios or navigational aids may not work, or visual or targeting aids may fail.

Table D-1. Expected response to radiation

Free-in-Air Dose Range cGy (rads)	Initial Symptoms	Performance (Mid-Range Dose)	Medical Care and Disposition
0 to 70	From 6 to 12 hours: none to slight incidence of transient headache and nausea; vomiting in up to 5 percent of personnel in upper part of dose range.	Combat-effective.	No medical care; return to duty.
70 to 150	From 2 to 20 hours: transient mild nausea and vomiting in 5 to 30 percent of personnel.	Combat-effective.	No medical care; return to duty; no deaths anticipated.
150 to 300	From 2 hours to 2 days: transient mild to moderate nausea and vomiting in 20 to 70 percent of personnel; mild to moderate fatigability and weakness in 25 to 60 percent of personnel.	DT: PD from 4 hours until recovery. UT: PD from 6 hours to 1 day. PD from 6 weeks until recovery.	In 3 to 5 weeks: medical care for 10 to 50 percent. At low end of range, death may occur for less than 5 percent; at high end, death may occur for more than 10 percent; survivors return to duty.
300 to 500	From 2 hours to 3 days: transient moderate nausea and vomiting in 50 to 90 percent of personnel; moderate fatigability in 50 to 90 percent of personnel at high end of range.	DT: PD from 3 hours until death or recovery. UT: PD from 4 hours to 2 days PD from 2 weeks until death or recovery.	In 2 to 5 weeks: medical care for 20 to 60 percent. At low end of range, death may occur for less than 10 percent; at high end, death may occur for more than 50 percent; survivors return to duty.
500 to 800	Within first hour: moderate to severe nausea, vomiting, fatigability, and weakness in 80 to 100 percent of personnel.	DT: PD from 1 hour to 3 weeks. CI from 3 weeks until death UT: PD from 2 hours to 2 days. PD from 7 days to 4 weeks. CI from 4 weeks until death.	In 10 days to 5 weeks: medical care for 50 to 100 percent. At low end of range, death may occur for more than 50 percent in 6 weeks; at high end, death may occur for 90 percent in 3 to 5 weeks.
800 to 3,000	Within first 3 minutes: severe nausea, vomiting, fatigability, weakness, dizziness, and disorientation; moderate to severe fluid imbalance and headache.	DT: PD from 45 minutes to 3 hours. CI from 3 hours until death. UT: PD from 1 to 7 hours. CI from 7 hours to 1 day. PD from 1 to 4 days. CI from 4 days until death	Medical care from 3 minutes until death. 1,000cGy: 100 percent deaths in 2 to 3 weeks. 3,000 cGy: 100 percent deaths in 5 to 10 days.
3,000 to 8,000	Within first 3 minutes: severe nausea, vomiting, fatigability, weakness, dizziness, disorientation, fluid imbalance, headache, and collapse.	DT: CI from 3 to 35 minutes. PD from 35 to 70 minutes. CI from 70 minutes until death. UT: CI from 3 to 20 minutes. PD from 20 to 80 minutes. CI from 80 minutes until death.	Medical care from 3 minutes until death. 4,500 cGy: 100 percent deaths in 2 to 3 days.
Greater than 8,000	Within first 3 minutes: severe and prolonged nausea, vomiting, fatigability, weakness, dizziness, disorientation, fluid imbalance, headache, and collapse.	DT and UT: CI from 3 minutes until death.	Medical care needed immediately. 8,000 cGy: 100 percent deaths in 1 day.

LEGEND: CI--combat ineffective (less than 25 percent performance)
DT--demanding task
PD--performance degraded (25 to 75 percent performance)
UT--undemanding task

b. Communication Nets. EMP will impact on the command and control nets of the ATKHB. Because the battalion is highly mobile and dispersed over a wide area, radio is the primary means of communication. Commanders must be prepared for EMP degradation by training with backup units and alternate means of communication.

Section III

BIOLOGICAL AGENTS

D-9. LIVING ORGANISMS

Classical biological agents include anthrax, plague, cholera, smallpox, botulism, thyroid, and microtoxins. These agents are living organisms that usually require a host body to mature. Their effects are usually delayed, so a natural outbreak may be difficult to differentiate from a covert attack. Some agents are highly persistent, while others have a short life span outside the host body.

D-10. TOXINS

Toxins are poisonous chemical substances produced by living organisms. They are found in nature but only in small quantities. Microorganisms, plants, animals, reptiles, and insects produce toxins.

a. Some commonly known lethal toxins that microorganisms produce are botulism, staphylococcus, and tetanus. Other toxins are produced by poison ivy, snakes, poisonous frogs, bees, spiders, and scorpions. Their toxicity ranges from extremely lethal to simple harassment such as an ant bite.

b. Tricothecene toxin is also known as yellow rain. T2, as it is commonly called, is a by-product of the respiration process of an organism that grows on decomposing grains. Individuals exposed to large doses of T2 soon experience an onset of violent itching, vomiting, dizziness, and distorted vision. Within a short time, they vomit blood-tinged material and later larger quantities of blood. The affected individuals die within hours, manifesting shock-like symptoms. Personnel may be exposed to smaller doses directly or indirectly through consumption of contaminated water or food. These individuals experience a slower onset of similar symptoms along with bloody diarrhea. Many die eventually of dehydration. Survivors may take several months to heal.

c. Another highly lethal toxin is the by-product produced by clostridium botulinum. This agent causes botulism and is extremely lethal to humans. It is several times more lethal than any of the standard chemical agents.

D-11. EFFECTS

Mild exposures to biological agents can severely degrade performance. Many of the classical diseases have delayed effects, whereas the effects of most

toxins are immediate. Toxins can create area contamination as well as downwind and vertical vapor hazards. Medical personnel, especially flight surgeons, must constantly monitor aviation personnel to detect unusual symptoms that may indicate exposure to a biological agent. FM 8-9 contains detailed information about the effects of biological agents.

D-12. PROTECTION

Commanders must be prepared to protect against biological agents used by an enemy. The US has immunization programs for many of these agents to help protect personnel against the diseases.

Section IV

CHEMICAL AGENTS

D-13. NERVE AGENTS

a. Effects.

(1) Extremely low dosages of nerve agents can disable personnel. The dosages can degrade the ability of aircrews to operate aircraft and ground personnel to support aviation operations. Nerve agents will severely disable personnel in any occupation requiring dexterity and high mental function. Nerve agent exposure is cumulative, so repeated exposure to low dosages will result in a cumulative increase in personnel disabilities.

(2) Nerve agents are lethal in either vapor or liquid form and can be employed as nonpersistent or persistent agents. They cause casualties through any portal of entry: respiratory tract, skin, eyes, or mouth. (They are usually ingested by mouth with contaminated food or water.) Within one to two breaths after aircrews have flown into a vapor cloud, they can inhale sufficient agents to cause death within 30 seconds to several minutes. When agents are ingested in contaminated food or water, symptoms may vary or be delayed.

b. Miosis.

(1) Extremely low dosages of a nerve agent will cause miosis. Symptoms of miosis are pinpointed pupils, blurred vision, and eye pain. The victim cannot adapt to night vision because the dark adaptation of the rods in the peripheral portion of the retina is restricted. Miosis may last for hours or several days. Full recovery may not occur for weeks. Symptoms of miosis may be evident in the absence of any other nerve agent symptom.

(2) The absence of miosis does not exclude nerve agent poisoning, especially in cases of ingestion or skin exposure. Miosis may occur almost immediately after exposure, or it can be delayed 30 minutes or longer after a mild exposure. When drinking with the M24 mask on, individuals must shut their eyes until the mask is cleared. This will lessen the chance of the eyes absorbing tiny doses of nerve agents. Intramuscular atropine injections

do not reverse miosis, but they may help slightly. Eye drops may be administered to relieve pain, but they do not return vision to normal. Recovery time depends on individual reactions. Near vision, night adaptation, far vision, and accommodation will slowly return to normal in varying degrees.

(3) During bright daylight, the only effect of miosis on vision may be dimness of vision. During periods of low visibility and at night, dusk, and dawn, the impact of miosis may be significant. Aircrews may not be able to fly.

(4) The impact of miosis on personnel is not limited to aircrews. Ground support personnel in ATS and AD units and command and control facilities will also be affected by miosis. This degradation of support capability will affect all aviation missions.

c. Antidotes.

(1) The nerve agent antidote treatment available for soldiers is the nerve agent antidote kit. Each NAAK includes one atropine autoinjector and one 2-PAMCL autoinjector. STP 21-1-SMCT, FM 21-11, and FM 8-285 describes the procedure for administering the nerve agent antidote. The NAAK will keep a nerve agent victim alive; every soldier must be thoroughly trained in its use and in subsequent first-aid measures to restore breathing. Nerve agents are powerful and require powerful antidotes to keep the victim alive. The NAAK must not be used on a person unless he has actually been exposed to a nerve agent. However, some personnel may panic during the initial encounter of chemical warfare on the battlefield. Many symptoms of other chemical agents, especially toxins, overlap nerve agent symptoms. Therefore, soldiers may misdiagnose the symptoms.

(2) The effects of atropine and 2-Pam C1 on aircrews are being studied. Serious side effects may impact on a person's fitness for flying duty. When an adequate dose of atropine is injected for lifesaving measures, dryness of the mouth is a side effect. This side effect will also occur even if no agent is present in the body and atropine is injected. Three autoinjections may cause hallucinations. One autoinjection will probably not seriously degrade an aircrew's ability to function. Some side effects of atropine are denial of illness, loss of insight, and loss of consciousness. Other symptoms include perceptual difficulty, judgment and memory impairment, confusion, short attention span, slurred speech, and restlessness. These reactions are also similar to the symptoms experienced from incapacitating agents such as psychochemicals, cocaine, and cannabis.

(3) The current nerve agent pretreatment drug is pyridostigmine. The pretreatment drug is taken every eight hours. The unit commander will determine when personnel will begin the treatment. Procedures for nerve agent pretreatment are in FM 8-285.

D-14. BLOOD AGENTS

a. Effects. Blood agents are nonpersistent agents and are usually dispersed by wind within 30 to 45 minutes. Within one or two breaths,

individuals can inhale a lethal dose of blood agents. Death may follow within one minute. Mild exposure will result in the same symptoms as those experienced from lack of oxygen. Soldiers who survive moderate to severe exposure may not be able to return to flying status for several weeks or longer. The damage to cells caused from lack of oxygen may result in persistent fatigue, irrationality, loss of coordination, vertigo, and headaches. One type of blood agent, CK, causes chronic bronchitis.

b. Antidotes. No current self-aid or buddy-aid antidote exists for blood agents. Amyl nitrite was recalled in 1984.

D-15. BLISTER AGENTS

Blister agents cause severe skin blisters and respiratory damage. These persistent chemical agents can cause injury in both liquid and vapor forms. The blisters damage the subdermal layers of skin and cell protein structure and take from weeks to months to heal. Very low concentrations of blister agents cause painful eye damage, to include conjunctivitis, edema of the lids, and a feeling of grit in the eye. In large concentration, mustard agents can cause permanent damage, corneal scars, or opacity. A tiny amount of liquid droplet (Lewisite or phosgene oxime) in the eyes may cause permanent injury or blindness. Blister agents cause systemic poisoning throughout the body and can impair performance. Some symptoms are blood pressure decrease, nausea, malaise, and dehydration. Blister agents are not usually lethal, but severe respiratory damage, secondary infection, or dehydration may cause death. FM 8-285 contains blister agent treatment procedures.

D-16. CHOKING AGENTS

Choking agents cause an initial symptom and then death. Death may be delayed for several hours to several days. Choking agents are nonpersistent agents and are initially irritating to the eyes. The initial choking effect may cause loss of aircraft control. During a later flight, the symptoms may again become severe as the lungs fill up with fluids. Procedures for treatment are in FM 8-285.

D-17. INCAPACITATING AND RIOT CONTROL AGENTS

Irritating agents and psychochemical agents employed by the Threat are not usually lethal. They should not cause death unless personnel are exposed to much larger concentrations than would normally be employed on the battlefield. FM 3-8 describes these agents in detail. FM 8-285 describes the effects and prescribes treatment for these agents.

D-18. PROTECTION

Even a mild exposure to agents may be fatal to aircrews, because aircraft control may be lost. Also, the long-term, systemic effects of agents and treatments can degrade performance, causing aircrews to be grounded. Flight surgeons must carefully monitor aircrews for symptoms of exposure to agents and advise the commander. When personnel are not wearing NBC protection and exposure to agents is suspected, they may be temporarily grounded and

observed for symptoms. However, in the absence of actual symptoms, the tactical situation may preclude preventive grounding. Aircrews should wear full MOPP4 gear during flight, and ground troops must also have adequate protection. Local commanders will make this decision based on METT-T and a risk analysis.

Section V

NBC DEFENSE FUNDAMENTALS

D-19. CONTAMINATION AVOIDANCE

Contamination avoidance--the first fundamental of NBC defense--means taking the appropriate action to reduce NBC hazards. The term avoidance does not necessarily mean aborting a mission or canceling an operation just because contamination is present. The factors of METT-T are considered for all operations, to include entering contaminated areas and preparing to encounter unknown contaminated areas. Soldiers go into hazardous areas only when necessary. The ATKHB uses the NBCWRS and survey monitoring to help locate contaminated areas.

a. Contamination Transfer.

(1) All soldiers should understand how they and their equipment become contaminated and how contamination spreads to other personnel and equipment. Contamination refers to the deposit or absorption of hazards. A unit may be the target of a Threat NBC attack, or the downwind hazard from a contaminated unit may cause agents to drift into another unit's area. Also, a unit may move or fly into contaminated areas from which aircraft can transport contaminated equipment or personnel.

(2) Rotary-wing aircraft can transfer contamination from the ground into the aircraft or vice versa. This transfer occurs when the rotor wash picks up dust, sand, leaves, or other contaminated debris. The debris or liquid droplets are then scattered throughout the aircraft. Some agents are like a fine spray and, although suspended in the air, can settle on personnel or equipment like dew. Aircraft vibrations increase the settling of agents in remote areas of the airframe such as panel points or rivets. Also, the type of paint on the aircraft affects contamination. Alkyd-based paints absorb the agents like sponges.

b. Principles. The principles of contamination avoidance are applying passive defensive measures; warning and reporting; locating, identifying, and marking NBC hazards; limiting the spread of contaminants; and avoiding contaminants.

(1) Applying passive defensive measures. Passive defensive measures reduce the chance of being hit by an NBC attack or, if hit, the aftereffects of the attack. They are not direct reactions to a specific attack but rather are measures taken to reduce vulnerability to being targeted. Each unit must

apply the principles of detection avoidance, dispersion, and training to protect personnel and materiel.

(a) Detection avoidance. Commanders must train their units in the principles of detection avoidance. If the Threat does not know the location of aircrews, it cannot target them for an NBC attack. Commanders should carefully choose unit positions and CP locations. They must ensure that their troops are protected as much as possible from Threat detection by using natural concealment, cover, and camouflage. In addition, aviation units can use air routes and firing positions that take advantage of natural vegetation and terrain features. These same principles apply to ground units.

(b) Dispersion. In some cases, the terrain will not be suitable for concealment. However, commanders can disperse their assets so that the unit presents a less lucrative target. By constantly varying the pattern of unit deployment, the commander avoids stereotypic patterns that allow the Threat to identify the type of aviation unit being observed.

(c) Training. Units must train to survive initial NBC attacks and to continue their missions without slowing down. One goal of this training is to render Threat weapons ineffective.

(2) Warning and reporting. Once an NBC attack has occurred and personnel have located an area that is contaminated or is threatened by downwind hazards, they must inform affected units without delay. Early warning will give personnel time to protect themselves against the hazard. The warning and reporting of attacks are done by simple, standard messages with the NBCWRS. The NBCWRS consists of standard reports, system management, and attack warnings. A recent addition to standard reports includes an NBC-6 summary report on chemical and biological attacks. Another addition is a chemical downwind message that gives surface meteorological data so that personnel can prepare new chemical downwind hazard predictions. FM 3-3 and GTA 3-6-3 show report formats.

(a) Collection sources. NBC information is collected from numerous sources. It may be obtained from a direct attack on a unit or after an attack through monitoring, surveying, and reconnoitering operations conducted by the ATKHB. Units in attack or hazardous areas will forward monitoring reports.

(b) Observers. For nuclear weapons, only designated observers will automatically forward reports on burst parameters. Nondesignated observers collect the information and hold it until it is requested. The battalion commander may select several aircrews as designated aerial observers. Their mission, like ground observers, is to obtain nuclear burst information. With their inherent mobility, aviation units can obtain good visual data such as cloud parameters, approximate ground zero location, and crater size. However, the designated aerial observer team is not necessarily comprised of the same personnel as the survey team. Company commanders determine the composition of the team. Utility or observation aircraft are probably best suited for the designated aerial observer mission.

(c) FARP elements. The commander must forward hazard information to FARPs and other separate activities. These elements need hazard information for selecting routes, setting up sites, and selecting clean areas for rest and relief. Unit SOPs should address how messages will be forwarded. The FARP will probably become contaminated while support aircraft will remain clean. However, the opposite may also occur. Therefore, aircrews and FARP personnel should establish a standard method of communicating NBC hazard warnings between them. Hand and arm signals, panels, flags, or any other type of standard signal should be included in unit SOPs.

(d) Attack warnings. Nuclear weapons pose significant hazards to aircraft, whether they are fired by Threat forces or by friendly forces. Therefore, commanders must have a thorough understanding of the attack warnings to ensure that the capabilities of aviation assets are not degraded. Warnings of friendly nuclear and chemical attacks ensure that friendly forces have time to protect themselves from the attacks. These warnings are called STRIKWARNs or CHEMWARNs. FM 3-3 and GTA 3-6-3 outline the STRIKWARN format. The executing commander is responsible for starting the warning. Messages must be sent to adjacent units and to the subordinate headquarters whose units are likely to be affected by the attack. When a nuclear strike is canceled, units warned previously must be notified without delay. Local policies may specify a wait time after the planned time of detonation when the message is automatically canceled. Aviation assets are dispersed throughout the battlefield. The supported unit may not be inside a STRIKWARN zone; therefore, it may not receive the warning. However, aircraft supporting that unit may be where overpressures will cause damage. Because of the long-distance hazard of nighttime flash blindness, aviation units must know when friendly nuclear weapons will be fired. For these reasons, executing commanders should send the attack warning to all aviation units. This message should include the limited safe distance for aircraft or the 1-psi overpressure radius. All aviation assets, including ground support, must receive information about friendly nuclear strikes. Units should develop alternate methods of passing an immediate warning to aircraft during flight.

(3) Locating, identifying, and marking NBC hazards.

(a) Once personnel detect an NBC hazard, they must mark and identify the hazard. Units must plan their area of operations outside of the contaminated area when possible. The unit has three methods of determining the limits of a contaminated area: reconnaissance, survey, and monitoring. Contaminated hazards may be the result of enemy or friendly forces. In either case, the effects are the same; they will affect either Threat or friendly operations equally. Therefore, hazardous area must be located, identified, and marked especially along defiles, routes, and point hazards. Marking may be immediate or hasty. Hazardous areas may be permanently marked later with standard NATO signs.

(b) Aviation assets are ideally suited for conducting reconnaissance and radiological surveys. Chapter 3 and FM 3-3 discuss radiological surveys. A new aerial radiological instrument, the AN-ADR-6, is being developed for use with aircraft. This instrument will automatically

record altitude and speed. It also preprograms terrain factors, eliminating the requirement for aircrews to land and determine an air-ground correlation factor. The AARS will make air surveys easier, safer, and more accurate.

(c) Chemical agent detectors or alarms are not mounted on aircraft. Using aircraft with point detectors in this role is not considered a feasible mission. Chemical reconnaissance with aircraft will be limited to flying a chemical detection team to selected areas. NBC detection equipment consists of standard issue items such as radiological detection and monitoring devices, total dose instruments, and chemical agent detection kits and alarms.

(d) Aircrews can help identify contamination on or in the aircraft. They can mount M8 or M9 chemical agent detection paper on the inside or the outside of the airframe at various locations. Because the paper does not stick to the paint on the aircraft, it should be wrapped around a painted area with the ends of the paper overlapping. Recommended areas for mounting this paper include the inside and outside of Plexiglas, seat frames, landing gear, floor panels, or other areas where agents are likely to collect. When the paper is placed on exterior Plexiglas, the spots can be seen from inside the cockpit during the day. Ground support personnel can read the paper on other exterior surfaces. Personnel should not use the paper in such a way as to create an FOD hazard.

(4) Limiting the spread of contaminants.

(a) When operating in a contaminated area, all personnel must take steps to limit further exposure to the hazard. One solution is to move personnel out of the contaminated area if the factors of METT-T permit. Reconnaissance personnel can often find clear routes through a contaminated area so that exposure to NBC hazards is reduced. If movement is not possible, the unit must employ individual and collective protection measures to prevent casualties.

(b) Personnel can cover ground equipment in the FARP and rear areas to avoid direct contact with contaminants and then discard the covers to operate the equipment. Examples of covers are tarpaulins, plastic bags, and cardboard boxes. If possible, personnel should keep equipment in original containers; for example, ammunition cans. Personnel can also place equipment in covered vehicles or shelters and operate it from these locations. These measures decrease the amount of contamination transfer and may reduce the need for decontamination.

(c) Protective measures for aircraft are similar to those for ground equipment. Areas that provide natural cover should be used for unit locations. Aircrews can park aircraft near buildings in built-up areas for limited protection. If cargo or utility aircraft pick up or deliver troops in contaminated LZs, aircrews must ensure doors, vents, and windows are closed to reduce contamination transfer.

(d) Placing a cover on the floor of the cargo area also helps reduce the amount of contamination transfer to the interior of the aircraft.

Plastic covers, paper, cardboard, clothing, or even leaves can aid in limiting contamination transfer. However, covers must be secured so that they do not present an FOD hazard. When flying rotary-wing aircraft out of contaminated areas and into clean areas, aircrews should open all doors and windows. About 20 minutes of flight will rid the aircraft of accumulated vapor hazards, but liquid contaminants will remain a hazard.

(5) Avoiding contaminants.

(a) The best way aircrews can keep aircraft free from contamination is to avoid flying them into contaminated areas. However, aircrews have no onboard means of determining, in the air or on the ground, which areas are contaminated. Therefore, they may be unable to avoid contaminated areas. Contamination avoidance also applies to ground support locations such as FARPs. FARPs are vulnerable because of their mission, but their mobility may lessen the chance of their being targeted by Threat forces. Aircraft are also vulnerable while being serviced at FARPs.

(b) Battalion and company commanders will rely heavily on the NBCWRS and intelligence reports to learn what battlefield areas are contaminated. However, some areas may not be reported and new attacks may occur at any time.

(c) Another source of information comes from the supported unit. Commanders should select alternate locations where they can complete their mission if the area of operations becomes contaminated. The flexibility of aviation assets allows aircrews to "fly around" known contaminated areas and still accomplish the mission. When choosing among options, however, the commander knows the primary consideration is always mission accomplishment.

D-20. PROTECTIVE MEASURES

Protection--the second NBC defense fundamental--is both individual and collective. When the unit cannot avoid contamination or is under direct attack, soldiers must take appropriate actions to survive. Specific actions are taken before, during, and after an attack. To sustain operations in an NBC environment, unit personnel must understand and practice individual and collective protection. Individual protection involves those measures each soldier must take to survive and continue the mission. These include acting immediately upon observing a nuclear detonation, donning MOPP gear, and wearing other protective equipment and devices. Collective protection provides a contamination-free working environment for selected personnel and precludes the continuous wear of MOPP gear.

a. Individual Protective Equipment and Clothing.

(1) MOPP gear. Soldiers are issued MOPP gear to protect themselves from a chemical or biological hazard. MOPP gear consists of the CB protective mask, hood, overgarment, overboots, protective gloves, an individual decontamination kit, detection equipment, and antidotes. FM 3-4 describes each item, to include service life and proper use.

(2) Nomex flight suit and gloves. Until a fire-retardant overgarment is fielded, aircrews will continue to wear the Nomex flight suit and gloves under the overgarment and protective gloves. When aircrews wear the Nomex gloves, they do not need to wear white cotton inserts.

(3) Aviation life support equipment. All soldiers must be issued a mask, an overgarment, and protective gloves in the correct sizes. Soldiers should ensure that they have the correct glove size so that their tactile sensitivity is not degraded. The size of the overgarment depends on the unit's policy for wearing ALSE. Usually, soldiers will wear the ALSE over the overgarment. During an emergency in a CB environment, aircrews need access to the contents of the survival vest. If the vest is worn under the overgarment, the soldier risks contamination to get to the vest. Commanders should carefully evaluate their policy and requisition overgarment sizes accordingly.

(4) Night vision devices. Current procedures state that aircrews should wear the mask hood over the flight helmet. When flying with night vision devices that attach to the flight helmet, aircrews will have to wear the hood under the flight helmet. Units preferring this procedure should procure the hood for the M25 mask, which is designed to be worn under the helmet. Wearing the hood under the helmet creates more hot spots; individuals may need to be refitted with a larger size helmet.

(5) M10A1 canister. Commanders should carefully evaluate whether individuals should change their own canisters. Changing the M10A1 canister is currently an organizational-level maintenance task. However, aviation personnel are widely dispersed on the battlefield, and maintenance or NBC personnel may not be available to change the canisters. Blood agents will degrade the canister, requiring the operator to change it after an attack. Therefore, aircrews should receive training in the procedure for changing the canister.

(6) M24 mask. When wearing the M24 mask while operating the AH-1 telescopic sight unit, aviators should be careful not to scratch the mask lens. They should use a clear visor over the mask lens to prevent scratches.

(7) Mask carrier.

(a) In some aircraft, the pilot may not have room to wear the mask carrier during flight. If not, the items from the carrier that are needed during flight should be stored in the aircraft or in the protective clothing. Units should establish a policy so that aircrews know what procedures they are to follow. The procedures will vary with the type of aircraft; therefore, units are encouraged to examine several possibilities and then establish standard procedures for each aircraft.

(b) Some of the items that will be needed during flight are the antifog kit, M258A1 skin decontamination kit, antiglare shield, and antidotes. Soldiers can take the packets of the decontamination kit from the hard plastic container and put them in overgarment pockets. Also, personnel

can make a storage area inside the cockpit for the carrier or the M258A1 kit and antidotes.

(8) Skull cap. Some personnel have procured the skull cap, a small cap of Nomex material worn under the flight helmet to keep the helmet from irritating the scalp. The skull cap can be worn under the mask head harness if it does not interfere with the seal of the mask about the face. If the cap is worn inside out, the seams will not dig into the scalp and cause more irritation.

(9) Overboots. Overboots can present a safety hazard (foot slippage) if personnel use laces stretched from wear or do not tie the laces properly.

(10) Gloves. During maintenance, such as preflight, postflight, and FARP operations, personnel can easily tear their protective gloves on the aircraft. When personnel perform maintenance tasks, they should consider wearing a leather glove over the CB protective glove but remove the leather glove before they fly.

(11) CB mask. The CB mask is required for protection against chemical agents. However, it can also protect aircrews from radioactive dust when they conduct aerial surveys or other missions over radiologically contaminated areas. The mask filters out dust or dirt that has radiological agents. In the absence of a CB threat, soldiers may wear other protection such as surgical masks or handkerchiefs. Aircrews may elect to wear the CB mask when large amounts of dust are present that irritate the eyes.

(12) Faceform. A faceform is used to store the M24 mask to prevent face set. Units may elect to keep the faceform in place to lessen the damage when the mask is being carried. The unit SOP should specify when to carry or remove the faceform.

(13) External drinking adaptor. TM 3-4240-280-10 and STP 21-1-SMCT describe the procedures for drinking water when personnel wear the M24 mask.

b. Mission-Oriented Protective Posture.

(1) MOPP levels. Commanders select a level of protection based on the chemical or biological threat, temperature, work rate, and mission. The levels of MOPP are levels 1 through 4 plus a mask-only option. FM 3-4 describes the MOPP levels and option.

(2) In-flight MOPP status. Aircrews fly in MOPP4 gear when a high threat of CB agent use exists or when agents have been used on the battlefield. Aircrews also fly in MOPP4 gear when they conduct NBC reconnaissance operations. Some of the reasons for this are as follows:

- Personnel cannot detect agents with their senses.
- Agent clouds travel vertically as well as horizontally.

- Aircrews exposed to CB agents may be grounded for an extended period.
- Aircraft are not equipped with advanced warning or detection devices.
- The donning of CB equipment, including the mask, during flight is not practical.
- Aircrews exposed to sublethal dosages of CB agents during flight may lose control of the aircraft and crash.
- Rotor wash may transfer droplets or contaminated dust inside the cockpit, creating a skin contact hazard.
- Aviation missions cover large areas, and agents may be present where troops are unavailable to report the attack.
- Even when agent hazard areas are marked on a map, winds and temperature gradients may change during the mission.

(3) On-the-ground MOPP status. When aircrews are on the ground, the MOPP status will depend on the ground situation. Preflight and postflight inspections may be conducted with a lower MOPP level if the ground situation does not require MOPP4. When aircrews fly in MOPP4 gear in uncontaminated aircraft, they may fly into known clean areas for rest and relief. If ground support areas (such as FARP, company, or maintenance areas) are clean, aircrews may lower their MOPP status once they are on the ground.

c. Performance Degradation and Countermeasures.

(1) Physiological and psychological effects. CB protective equipment will keep soldiers alive. However, the equipment degrades performance because it hinders dexterity, limits vision and movement, and increases heat stress. Commanders must weigh actual performance degradation against perceived problems with the equipment. MOPP gear has a physiological and psychological impact on personnel. Training is the key to limiting performance degradation. Thoroughly trained personnel can perform most required tasks while wearing MOPP4 gear.

(2) Vision. Use of the M24 protective mask reduces the peripheral vision of aircrews. To overcome this limitation, aircrews must continuously scan in all directions. The normal range of motion for the head is 90 degrees from either side of the centerline. The mask limits this 180-degree range to 140 degrees. Therefore, aircrews must turn their heads to scan and compensate for the lost visual range. Additionally, the mask blurs or distorts the aircrew's vision in the cockpit, especially during night operations.

(3) Fatigue. Each crew member must become familiar with the symptoms and causes of fatigue. These are described in FM 1-301.

d. Collective Protection. Collective protection shelters are designed to keep out unfiltered outside air by means of positive overpressure.

Personnel inside this shelter do not have to wear CB protective equipment. In a contaminated environment, either a shelter or clean terrain is needed for long-term rest and relief such as sleeping, showering, eating, or shaving. The continued integrity of the shelter depends on personnel following entry and exit procedures closely. The shelter becomes worthless if contamination is tracked in or carried in. Air reconnaissance units are widely dispersed while operating throughout the battlefield. Therefore, they must carefully evaluate the number and placement of shelters. Shelters that belong to supported units may be unable to accommodate aviation personnel. Therefore, their use by aviation elements must be coordinated. FM 3-4 describes collective protection shelters and their operation, including entry and exit procedures.

e. Protective Actions.

(1) Aircraft protection while parked.

(a) Aircraft on the ground must be protected from strong winds. In a high-nuclear-threat environment, aircrews should park aircraft inside natural revetments, bunkers, barricades, or man-made structures and then tie down the aircraft. Aircraft should also be covered as much as possible to protect them from toxic rain. Intelligence personnel can estimate what areas are likely to be targeted. When friendly nuclear strikes are planned, information on ground zero is given.

(b) Blast is not strictly an LOS hazard as is thermal radiation. The blast wave bends around obstacles and rolls over hills in the same manner as normal winds. However, the reverse slope of a hill may substantially lessen the effect of winds. Just because an explosion cannot be seen from behind a hill does not mean the blast wave will not affect that location. Aircraft cannot be effectively protected from the overpressure. Taping the windscreen may help, but it is not effective against higher pressures.

(2) Aircraft protection during terrain flight.

(a) Aircrews can take several immediate actions to protect aircraft during a nuclear attack. When a nuclear detonation occurs during the day, the aircrew will not immediately know the yield or distance. At night, the aircrew may become blinded. Immediate action depends on whether the aviator is blinded. During the day, flash blindness is not likely unless personnel actually focus on the fireball. At night, however, the risks of flash blindness are substantial.

(b) For friendly nuclear strikes, aircrews should mark the areas on a map during premission planning so that they can stay outside minimum safe distance limits. However, once a nuclear detonation occurs, aircrews will have no indication of who fired it. When a nuclear detonation is observed, the rotary-wing aviator in terrain flight should turn away from the fireball immediately and land the aircraft as soon as possible. Even though nuclear detonation will be visible, the aircraft may not be within range to receive severe damage.

(c) The aviator has to make a split-second decision upon sighting the fireball. By immediately turning the aircraft away from the fireball, the aviator increases his chance of survival. Also, the missile effect on the Plexiglas is less hazardous to the aircrew because it travels away from the cockpit. In addition, the airframe provides protection from external missiles. After landing the aircraft, the aviator and crew should remain inside because the aircraft offers some shielding against radiation. The aviator should keep the aircraft on the ground for several minutes to ensure that either the blast wave has passed or the aircraft is far enough away to be unaffected by the blast. The positive and negative phases of the blast will occur at about the same time. Therefore, the aircrew should wait until debris stops falling before exiting the aircraft. After checking the airframe to ensure it is not damaged structurally, the aircrew can continue the mission.

(d) At night, 10-second flash blindness can occur at distances beyond the range of any other effect, including EMP. For large yield nuclear detonation, flash blindness can occur at the horizon. It will occur before individuals know they have retinal burns. For rotary-wing aircrews, protective measures are limited. However, when the aircrew wears the AN/PVS-5 that fits flush against the face, the amount of light that can enter around the goggles is reduced. Also, another protective measure is for one aviator to wear an eye patch over one eye. When either the AN/PVS-5 or the eye patch is worn, one aviator should have enough vision to land the aircraft. For the first few seconds after an aviator removes either the AN/PVS-5 or the eye patch, his immediate action is to gain altitude. (This is the same immediate action prescribed for goggle failure.) If the aviator is able to see, he should land the aircraft in the nearest suitable area. If the aviator is wearing no protection, he must immediately determine his vision limitations. If the aviator has little or no vision, then he should gain altitude and attempt to wait until his vision returns. If the aviator has some peripheral vision, he should use night vision techniques to scan the area.

(3) Aircraft protection during cruise altitude. At night or during the day, aviators have the best chance of survival if they turn the aircraft away from the point of detonation and gain altitude. They should also protect their face and neck from Plexiglas fragments. In rotary-wing aircraft, aviators may be able to gain time until their vision returns. Nuclear detonations will probably affect Threat electronic air defenses. Placing distance behind the point of detonation and the aircraft and gaining altitude will lessen the damage from the blast. If detonations are multiple, then the aviator can estimate the direction of the largest or closest detonation. Turning the aircraft away from the detonation will lessen the possibility of thermal radiation damage to the eyes. After the blast wave passes, the aviator should decrease altitude and attempt to estimate damage by control feedback. If the aviator suspects damage, he should land the aircraft as soon as possible to inspect it.

(4) Equipment protection against EMP. Equipment may be protected against EMP, but this protection must be installed by the manufacturer. Field-expedient methods of wrapping equipment in foil or burying it are not

feasible. If electronic components have been EMP-hardened by the manufacturer, maintenance crews must be careful not to degrade this protection. Electrical equipment that meets specifications for protection against lightning strikes is not necessarily guarded against EMP, but any protection may help. Lightning strikes in milliseconds, whereas EMP effects occur in only nanoseconds (billionths of a second).

Section VI

DECONTAMINATION

D-21. DECONTAMINATION FUNDAMENTALS

a. In the past, Army doctrine dictated that when a unit became contaminated, soldiers stopped fighting, pulled out of battle, and found a chemical unit for the cleanup. This process was time-consuming and not tactically or logistically feasible. With the Threat's capability to contaminate large areas of terrain, a contamination-free environment after every chemical attack is impracticable if not impossible. Today's emphasis is on "fighting dirty" and conducting hasty decontamination along with natural weathering to reduce chemical or biological hazards.

b. The four principles of decontamination are as soon as possible, only what is necessary, as far forward as possible, and prioritized. The commander uses the factors of METT-T and some additional considerations to determine when, where, and how to conduct decontamination. When planning operations, commanders should ask these questions:

- How long have personnel been operating in MOPP gear?
- What missions are planned in contaminated areas?
- What are the capabilities of NBC personnel and the decontamination team?
- What external support is available from chemical units?
- What decontamination support will the supported unit provide?
- How will separated elements receive support?

D-22. DECONTAMINATION LEVELS

Figure D-2 shows ground and aircraft decontamination levels. Unit personnel conduct basic skill tasks and hasty decontamination, whereas a chemical decontamination unit usually conducts deliberate decontamination. Although hasty decontamination reduces the hazard level, personnel must still use protective equipment. The goal of deliberate decontamination is to reduce the hazard level to a point where protective equipment is no longer required. When the tactical situation permits, deliberate decontamination may be performed during unit restoration operations in the rear area. Chemical decon-

tamination units establish deliberate decontamination sites, and the supported unit assists in the operation.

D-23. AIRCRAFT DECONTAMINATION

The sensitivity of aircraft components to caustic solutions has necessitated the development of special decontamination procedures. ART and AHT commanders must combine these special procedures with decontamination principles and determine where and when to conduct decontamination operations. Spot decontamination is the most cost-effective technique and will limit the spread of agents. Units may find that deliberate aircraft decontamination is not cost-effective when aircraft are in great demand. Because aircrews fly in MOPP4 gear, commanders must compare how decontamination versus no decontamination will affect the mission.

a. Decontaminants.

(1) Only approved cleaning compounds may be used to decontaminate aircraft. Caustic decontaminants, such as DS2, STB, bleaches, or sodium hypochlorite, are not considered safe. For example, STB corrodes aircraft skin and metal components and DS2 corrodes rubber or plastic components and Plexiglas.

DECON TYPES	GROUND FORCES	AVIATION FORCES
Basic Soldier Skills	Skin Decon Personal Wipedown Operator Spraydown	Skin Decon Personal Wipedown Aircrew Spot Decon*
Hasty	MOPP Gear Exchange Vehicle Washdown	MOPP Gear Exchange Aircraft Washdown*
Deliberate	Detailed Troop Decon Detailed Equipment Decon	Detailed Troop Decon Detailed Aircraft Decon*
*Aviation decon techniques substituted for ground forces decon techniques.		

Figure D-2. Ground and aircraft decontamination levels

(2) Soap and water, kerosene, JP8, and diesel fuels are approved as decontaminants on selected parts of aircraft. JP8 is effective in removing some agents from aircraft skin and components. However, it does not neutralize the agents. Personnel must use care when handling JP8. When using a cloth soaked with JP8 to wipe contaminated areas, personnel must avoid wiping internal components near the exhaust. If water is available, personnel should use it to rinse off the JP8.

(3) When components are removed from the aircraft for repair, some caustic chemical may remain. Personnel must decontaminate these components before cannibalization or overhaul. Once components have been decontaminated, personnel must rinse the components thoroughly before they are reinstalled on the aircraft. No guidelines exist on which decontaminants can be used on specific components.

(4) Actual flight and aeration can help decontaminate external surfaces. The wind will blow some of the agent off the aircraft skin and expedite evaporation. However, some of the agent will remain in the paint and continue to be a hazard.

(5) Personnel must be careful when using pressurized water for decontamination. Aircraft skin and internal components can be damaged by moderate to high water pressures. Personnel must follow the guidelines in the appropriate aircraft maintenance manuals. Commanders should ensure that safety, maintenance, and NBC personnel coordinate decontamination operations.

b. Decontamination Techniques.

(1) Spot decontamination. The goal of spot decontamination is to limit the spread of contaminants by removing most of them from selected areas of the aircraft. These areas are where personnel work and may pick up and spread the contaminants; for example, the landing gear, fuel ports, doors, and handholds. Either aircrews or ground personnel should conduct the spot decontamination. Fuel and soap and water are probably the most common decontaminants.

(2) MOPP gear exchange. In a contaminated environment, MOPP gear exchange and rest and relief operations must be conducted. Every soldier must know how to change his MOPP gear to survive. Aircrews are often isolated from their parent unit and may not be able to return to their unit for MOPP gear exchange. Therefore, they will conduct the exchange with units in their mission area. When the mission allows, aircrews may return to a unit decontamination area for the exchange.

(3) Aircraft spraydown. Aircraft spraydown is basically the same technique as vehicle washdown and includes detailed, time-consuming procedures for both exterior and interior decontamination. Units are encouraged to develop site layouts that are appropriate for their specific missions and the terrain. In addition, chemical units should develop procedures for assisting aviation units at spraydown sites.

(4) Deliberate decontamination. Deliberate decontamination sites are established by chemical units, usually in the rear areas. The supported units conduct their own personnel and equipment decontamination. The chemical unit decontaminates vehicles, provides technical assistance, and supervises the entire site. Aviation units must be thoroughly familiar with their responsibilities at these sites. The supported aviation unit must coordinate closely with the chemical unit to ensure that aviators do not land contaminated aircraft in clean areas.

c. Decontamination Operations.

(1) Arming and refueling operations. Arming and refueling operations normally take place in the FARP. All areas that FARP personnel touch should be decontaminated. In most cases, these are fuel port areas. A more detailed decontamination is required for attack aircraft because of onboard weapon systems. Personnel should be careful to not soak areas of these firing systems that are sensitive to the decontaminant.

(2) Entry and exit procedures. During training, commanders should outline entry and exit procedures for all types of aircraft because the procedures will vary with each type of aircraft. When procedures have been established, aviators should practice them until they become proficient. In addition, FARP personnel must become familiar with the procedures. Aircrews should signal the FARP personnel if they intend to exit the aircraft. Then the FARP personnel can decontaminate most areas that the aircrews will touch in exiting the aircraft. The crew chiefs of most aircraft can conduct decontamination with equipment from the FARP. The possibility of transferring contamination into the cockpit is increased when aircrews exit the aircraft at the FARP. Aircrews should attempt to limit the amount of contamination transfer by using contamination avoidance measures. Before entering the aircraft, aircrews should use an M258A1 kit to decontaminate their gloves and overboots.

(3) Preflight and postflight inspections. When conducting preflight and postflight inspections on contaminated aircraft, aircrews must try to avoid becoming contaminated themselves. Spot decontamination helps reduce this possibility. Decontamination of gloves and overboots after the inspections will likewise reduce the chance of transferring contaminants into the aircraft. Aircrews may need to wear wet-weather clothing to keep most of the contamination off the overgarment. Preflight and postflight inspections and decontamination operations during or after these inspections are physically demanding tasks that increase heat stress.

(4) Maintenance inspections. Personnel may conduct maintenance inspections before or after decontamination of the aircraft. Inspection crews use the decontamination techniques discussed in (2) and (3) above to avoid spreading contamination.

(5) Repair or recovery. Repair or recovery crews should be aware of the contamination level before they enter the area. Teams will evaluate the situation to determine when or if an aircraft component can undergo decontamination. Some items may be decontaminated before they are returned to the maintenance section if the maintenance area is clean. However, if the maintenance area is contaminated, decontamination should occur there. Units may be able to move clean aircraft or components into clean facilities. Likewise, units may be able to direct contaminated aircraft or components to contaminated facilities. The management of clean and contaminated areas depends on the intensity of the battle and the availability of contamination information.

(6) Cannibalization and overhaul. The same decontamination considerations of clean versus contaminated aircraft and components also apply to cannibalization and overhaul maintenance activities. Maintenance unit leaders should closely evaluate specific repairs that require a clean area.

D-24. AIRCRAFT DECONTAMINATION OPERATIONS

Aircraft decontamination poses unique challenges to commanders. They must decide when to conduct the various levels of decontamination. Normally, the ATKHB conducts hasty decontamination, but it may conduct a deliberate decontamination if the situation requires it and time is available. Decontamination operations are normally conducted at battalion level and require an area that meets the appropriate criteria.

a. Site Selection Requirements. The decontamination area or site must accommodate the required aircraft, have a readily available water source, and allow for adequate drainage. The site should also be relatively secure but close enough to the FLOT or area of operations and FARP to facilitate a reasonably quick turnaround of aircraft. The site must have sufficient NOE routes no less than 2 to 3 kilometers from the station for entry and exit. The site must also have slope angles not exceeding the capabilities of the aircraft assigned to the battalion. Tentative decontamination sites must be considered and integrated into the tactical plan as are tentative CP and FARP sites.

b. Station Layout. Any of several techniques may be used to decontaminate aircraft. An effective method is the one-step method. In this method, companies are sequenced into a particular area, shut down, decontaminated, and returned to duty. The battalion is responsible for selecting and securing the site as well as augmenting chemical personnel. The chemical unit is responsible for operating the site. Figure D-3 shows a typical layout of an aircraft decontamination station. After the site is selected, reconnoitered, and secured, battalion NBC defense personnel and the supporting chemical unit jointly establish the decontamination site. The battalion commander may choose to employ the tactical CP or a representative from the S3 section to supervise the operation. As each company-level unit is sequenced through the station, the remaining companies provide security. After aircraft are shut down, the entire aircraft or specific areas are washed with hot, soapy water and rinsed. If available, hot air may be used to dry the aircraft and decontaminate the interior or otherwise sensitive areas of the aircraft. This sequence is continued until all battalion elements have completed the decontamination. The site is then cleared and the battalion continues its mission.

c. Safety Precautions.

(1) At no time will station personnel cross in front of an aircraft that has a turret weapon system whether it is armed or not. If an aircraft has a weapon system of any type, the aircrew will ensure that the system is cleared and placed on SAFE before the aircraft enters the decontamination station.

(2) At no time will station personnel cross in back of an operating helicopter unless they maintain a proper distance from the turning tail rotor.

(3) The team leader will give all signals to aircrews. Before signaling the aircrews to move aircraft, the team leader will have visual contact with the other team member. Team leaders in each substation will wear white arm bands in the manner prescribed by the unit SOP.

d. Alternate Site Layouts. Units are encouraged to establish their own site procedures and equipment requirements. Alternate sites should be considered during the planning phase of battalion operations, particularly decontamination operations. See FM 3-5 for sample alternate site layouts.

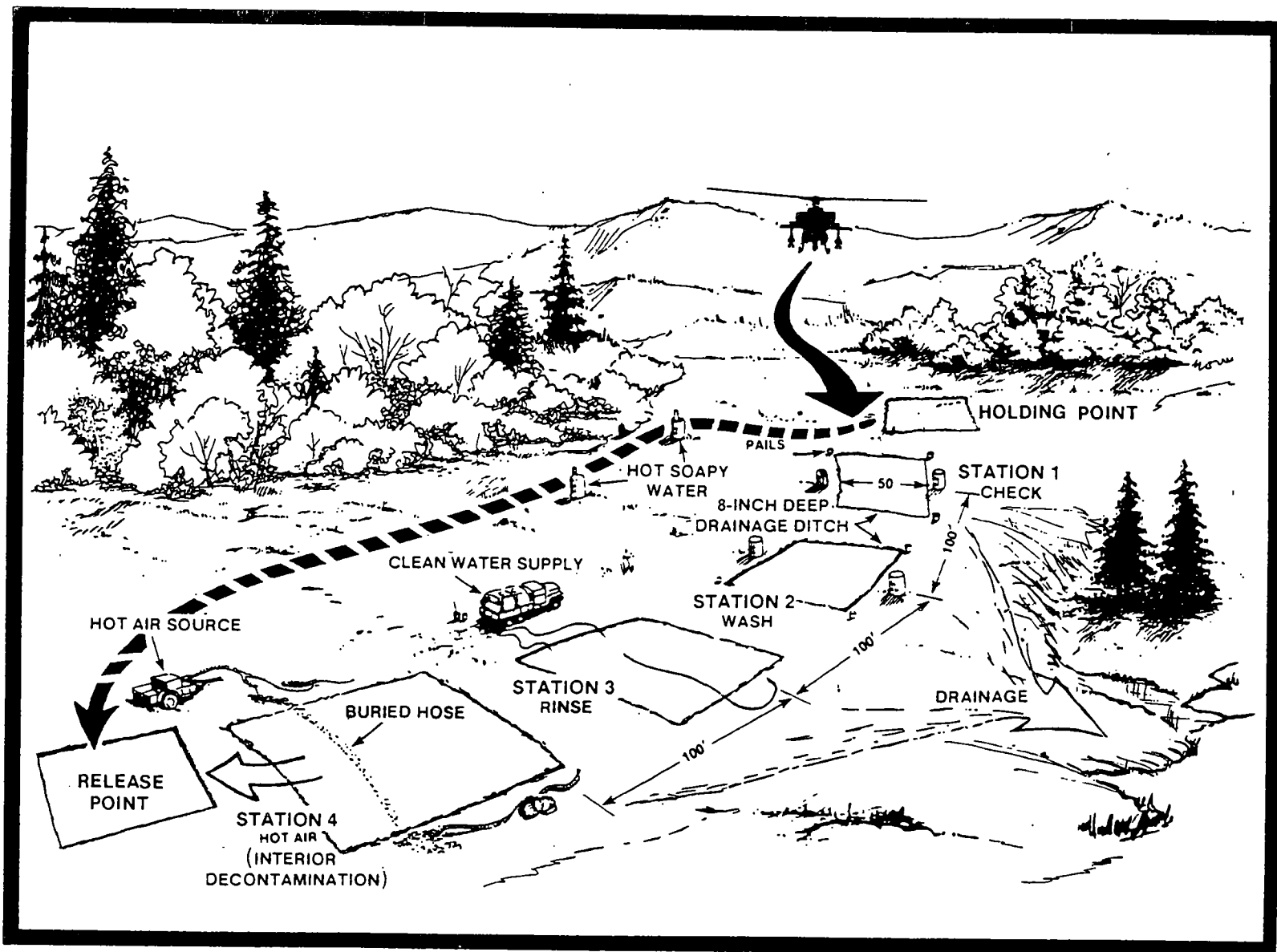


Figure D-3. Aircraft decontamination station

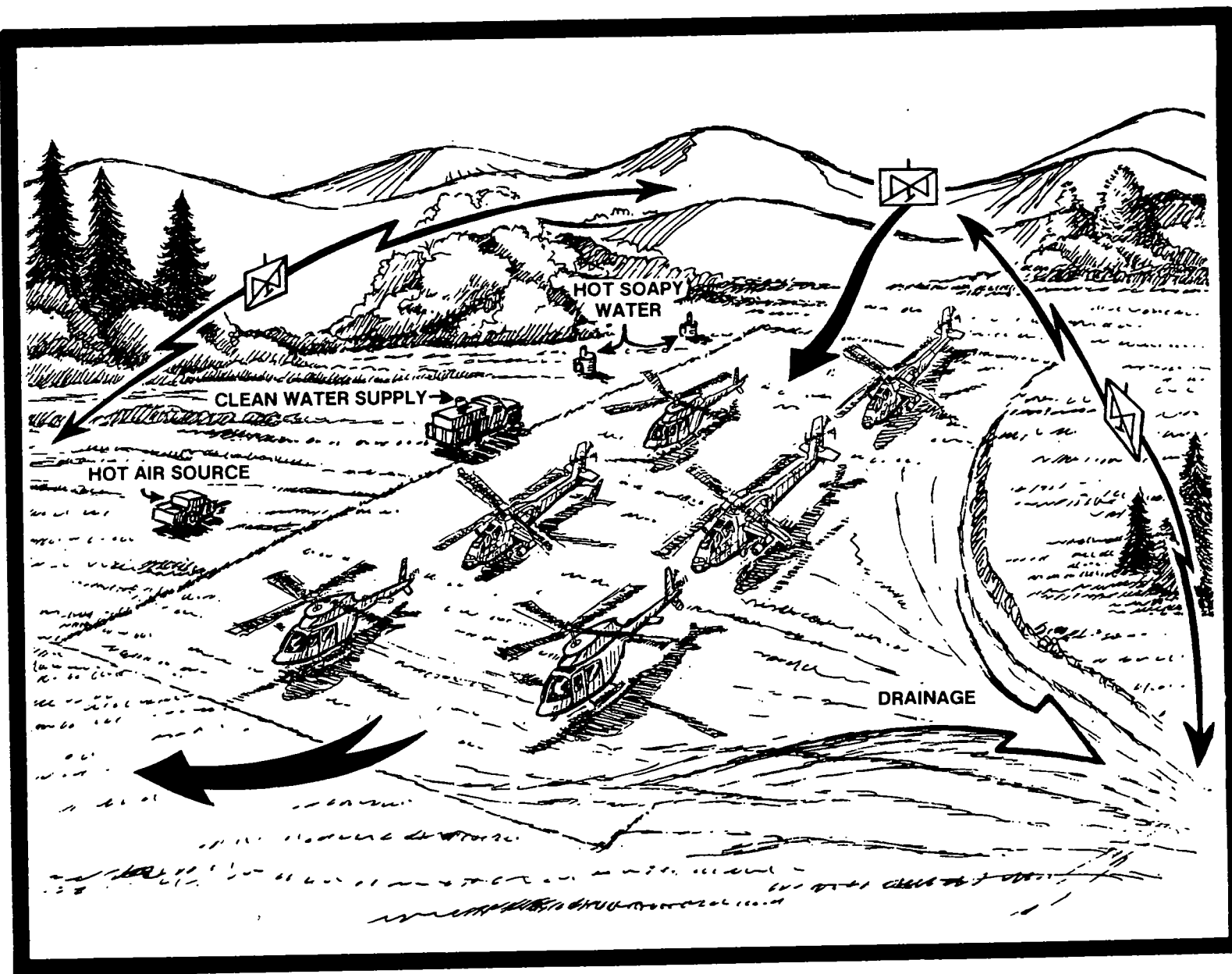


Figure D-3. Aircraft decontamination station (continued)

Section VII

SUSTAINED OPERATIONS

D-25. FORWARD ARMING AND REFUELING POINTS

a. Aircrew Support. Aviation units use FARPs to sustain operations. FARPs enable the unit commander to apply continuous pressure on the Threat by decreasing turnaround times and by increasing loiter times. If FARPs are near or collocated with other units that have NBC support, NBC support for the aviation elements may be arranged with those units. In a CB environment, the commander will have difficulty keeping attack aircraft in operation. However, the attack teams can rotate in and out of the MOPP gear exchange or rest and relief site after several turnarounds. Clean and contaminated FARPs may be established to facilitate rapid relief-on-station operations and prevent repetitive contamination. The mission and temperature will determine how often the crews visit a rest and relief station. They can visit either before or after refueling operations at the FARP. If additional aircrews are available and the mission allows it, a crew change during rest and relief could make aircraft available for more missions.

b. FARP NBC Planning. Detailed preplanning is the key to successful FARP operations in an NBC environment. Because FARPs are vital to the aviation mission, the questions below are included to assist commanders in considering specific issues in planning FARP operations. They cover general, nuclear damage, and CB contamination considerations.

- How will friendly STRIKWARNs or CHEMWARNs be passed to FARPs and to aircraft being serviced at the FARPs?
- Is the use of smoke planned to lessen FARP vulnerability during site preparation and closure?
- Is at least one member of the FARP trained in the two considerations above?
- Who estimates the dosage when the FARP is operating in a radiological contaminated area? How will this dosage estimate affect operational planning?
- Are FARP personnel aware of nuclear damage to aircraft? Can they identify nuclear damage to armament systems?
- Do FARP personnel know how to minimize nuclear blast effects and thermal damage to fuel blivets and other FARP equipment?
- Will the supported or parent unit assist in hasty decontamination?
- Who provides guidance to FARP ground personnel concerning the best routes through or around contaminated areas?

- What visual or radio communications can FARP personnel use to warn the aircrew on an incoming aircraft that a FARP site is contaminated? Also, how does an aircrew warn FARP personnel that the aircraft is contaminated?
- In a chemically contaminated area, who should dismount at the FARP?
- If aircrews dismount, what provision is made for spot decontamination to lessen the transfer of contamination?
- What provision is made to keep contamination out of the cockpit (especially that carried in on boots) when aircrews enter the aircraft?
- During missions, how can FARP personnel wearing MOPP4 gear keep up with the work load? What plans are made for rest and relief or assistance?
- When JP8 is used as a spot decontaminant, are personnel trained in its hazards?
- Are FARP personnel trained to use covers in a manner that does not create FOD hazards?
- Are FARP personnel prepared to accept supplies that are contaminated?
- What personal needs are provided for aircrews at the FARP?

D-26. AIRCRAFT MAINTENANCE

In an NBC environment, maintenance operations will be affected more by nuclear detonations than by chemical or biological agents. Nuclear detonations will cause greater structural and component damage than conventional explosions. While CB agents create a lethal environment for personnel, they do not damage aircraft components or airframes.

D-27. ARMY AIRSPACE COMMAND AND CONTROL

The control of airspace is important during a conflict as it is in peacetime. A²C² elements must work closely with NBC elements or control centers. STRIKWARNs and CHEMWARNs may be passed through A²C² networks as well as units. NBC personnel will use NBC contamination information and friendly nuclear minimum safe distances to establish air corridors.

D-28. SURVIVABILITY

a. Radiological Contamination. A nuclear strike may cause aircraft to crash or suffer a hard landing. Surviving aircrews should be alert for forest fires or other fires caused by thermal radiation. However, radiological contamination will be the aircrew's most significant hazard. If the aircraft goes down in a fallout area or the crew receives fallout, the dose

rates can be high enough to cause casualties. Each aircraft will usually have an IM93 or a DT-236/PDR-75 that measures the total dose received by the aircrew.

b. Radiological Particle Ingestion. If the situation permits, the crew should attempt to dig a deep fighting position or find cover such as a cave, an upper story of a house, or an abandoned armored vehicle. Living off the land will pose long-term hazards from the ingestion of radiological particles. The best preventive measure for this is to wash the food. Heat will not reduce any radiological hazard. Running water will dilute radiological agents and reduce the risk of drinking contaminated water. Radiation weakens the body's ability to fight disease. One of the first symptoms of radiation sickness is diarrhea.

c. Lethal Chemical Agents. In a lethal chemical environment, surviving personnel will be faced with many additional hazards. The current overgarment is not made of fire-retardant materials. When the situation permits, the crew should readjust the CB protective gear and take action to find out if the area is contaminated. They can use the M8 or M9 detection paper onboard the aircraft to identify chemical agents and the M256 detection kit to identify vapors. However, these will not detect toxins or biological agents. The crew should look closely at wildlife or population centers for evidence of lethal chemical agents. If personnel do not have another set of MOPP gear, they should not remove the gear they are wearing. If a second set of MOPP gear is available and the situation permits, the crew should change into the new clothing.

Section VIII

SMOKE OPERATIONS

D-29. SMOKE EFFECTS

a. Smoke is more effective when it is used at night or with natural obscurants such as fog, rain, natural dust, or battlefield dust and debris. Smoke is the one obscurant that can be placed, within meteorological constraints, where the user wants it. Figure D-4 shows how smoke and other obscurants affect electro-optical systems.

b. Smoke is a suitable medium for hiding and dispersing CB agents. These agents may include irritants such as riot control agents, incapacitants, and other lethal CB agents. Smoke will prolong the life of CB agents by reducing the effects of sunlight or other weather conditions on agent persistency.

c. Smoke makes it difficult for personnel to see the target. The extent of visual difficulty depends on the type of smoke used and its mixture with natural obscurants. The Soviets possess smokes that deny visual identification and adversely affect light-intensifying devices and near-infrared devices. Mid- to far-infrared devices, thermal imaging, and heat seekers are

degraded when the contrast between the target and the background is reduced. The extent that a laser can be degraded depends on the energy of the laser; the lower the energy, the more the laser can be degraded. Large dust storms can adversely affect Threat acquisition systems. The Threat employs self-screening smokes during road movement.

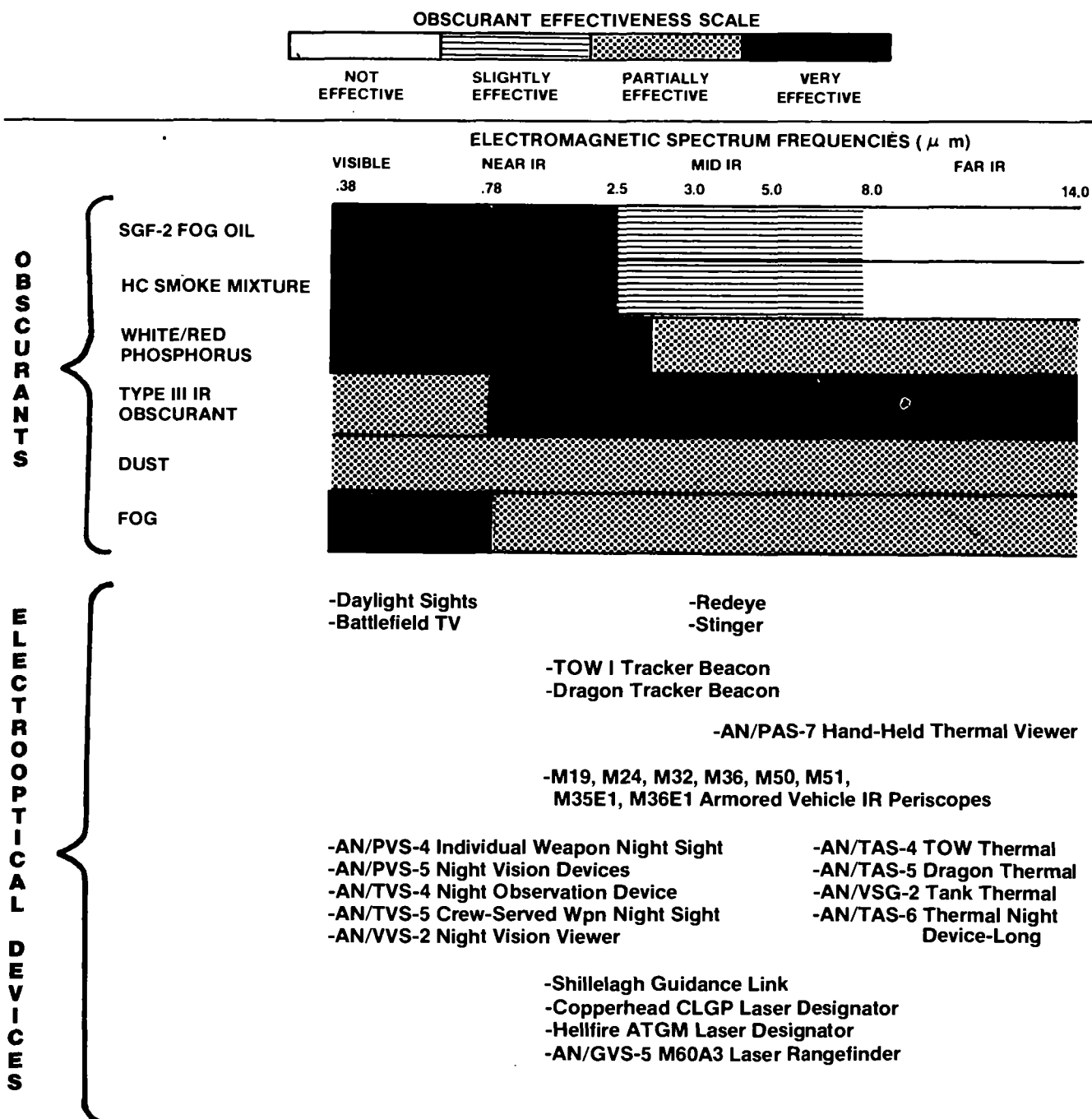


Figure D-4. Battlefield obscurants

d. Soviet doctrine regarding smoke emphasizes the employment of smoke with other decoy or deception operations. Smoke draws attention to a general area, but the observer must determine where the unit or target is in the smoke and whether the smoke really has targets.

D-30. SMOKE EMPLOYMENT

a. Threat Employment. When the Threat employs smoke against US maneuver forces, aviation missions must increase to assist with observation and command and control. When employed on terrain features, smoke can force aircraft up and into Threat air defense coverage. Smoke denies low-level corridors or possible LZs for air assault operations. Large area smoke can obscure terrain features that serve as navigational aids. Silhouetting aircraft against smoke increases their vulnerability. Smoke employed on ground-based aviation support units, such as FARPs and maintenance, will disrupt aviation operations. FM 100-2-1 provides detailed information about the Threat's use of smoke.

b. US Employment.

(1) US forces can employ smoke to keep the Threat from observing and acquiring them. For example, US forces use smoke for obscuring an enemy or for screening their units. They also use smoke for deception, identification, and signals. Properly employed smoke enhances unit survivability. Units have organic assets such as smoke pots and grenades and external assets such as artillery and generators. Large scale or sustained smoke can be employed with smoke-generating systems. FM 3-50 discusses deliberate smoke employment.

(2) When US forces employ smoke on Threat forces, their ability to observe and acquire targets will be affected. Smoke draws attention, so aircrews may tend to concentrate more on the smoke than on the targets. Aircrews may have difficulty seeing targets in the smoke or seeing targets leave the smoke. When a ground vehicle leaves a smoke screen, it is easier to acquire because it is silhouetted against the smoke. Personnel need to be aware of how smoke affects their ability to see enemy targets.

Section IX

TRAINING

D-31. AIRCREW TRAINING

Aircrew training should be conducted in two phases: the ground phase and the air phase. The ground phase acclimatizes aircrews and ground personnel to wearing MOPP gear. The air phase is more flexible; commanders must determine how much of their units' flight time they can devote to NBC training. The concepts presented here can be applied to ground crews as well as aircrews.

a. Ground Phase.

(1) Acclimatization must be accomplished gradually, and once completed, it must be maintained. Therefore, before aircrews fly with MOPP4 gear, they should be able to operate in MOPP4 gear on the ground for a minimum of six hours without interruption. This figure is not intended to be a limiting factor but rather a guideline for the commander. When aircrews enter into the ground phase of training, they should understand that the purpose of the training is twofold. First, it allows them to acclimatize to the protective clothing. Second, it gives them an idea of their personal limitations. For aircrews to realize their personal limitations, they must conduct the same activities they normally do in an uncontaminated environment. The commander must stress this, because all activity does not cease when the unit goes into MOPP4 gear. Normal operations include--

- Drinking.
- Map indexing.
- Flight planning.
- Preflight checks.
- Mission briefings.
- Basic personal hygiene.
- Flight clothing adjustment.
- Operation overlay construction.
- Routine maintenance such as scheduled or run-up maintenance.
- Cockpit procedures such as tuning radios, adjusting switches, or completing checklist items.

(2) As individuals progress through the ground phase, they will identify those areas that affect them the most. After determining their limitations, individuals can find new ways in which to accomplish the task or modify existing procedures.

b. Air Phase. Flight time is a valuable asset to every unit. Although the air phase can be done during existing training, a commander may find that NBC training degrades his unit's ability to accomplish the mission. General goals are recommended below, but the actual method to reach these goals is left up to the commander. The recommended goal for individuals is 6 continuous hours of operating in MOPP4 gear. The goal for units is 48 continuous hours of operating in a simulated NBC environment.

(1) For training to be realistic, commanders must rotate unit personnel, as they will in combat, through collective protection shelters. If enough shelters are available, 50 percent of the unit may be participating

in rest and relief at any one time. Accordingly, unit effectiveness and mission accomplishment will be proportionally degraded. To achieve acceptable performance levels, commanders may have to move all or part of their units to a clear area.

(2) When implementing training programs, commanders should gradually increase the time that aircrews fly in MOPP4 gear over a given period. However, the training must be in line with individual crew member capabilities and safety requirements. Commanders should refer to the scheduling guide in AR 95-1 when developing crew work and rest schedules.

D-32. TRAINING CONSIDERATIONS

As with all training, the aircrew training program should be carried out aggressively and consistently in a realistic manner. However, commanders should remember that safety should never be sacrificed for realism. With this in mind, unit trainers and commanders must be aware of certain factors that will affect their units' success in carrying out their training program. Some factors are described below.

a. Ambient temperatures and humidity may be very high, thereby increasing the wet bulb globe temperature. Unit SOPs should specify that every soldier must be familiar with the symptoms of heat stress and other heat-related injuries. Early morning and late evening hours are the best times to conduct NBC flight training because of the lower temperatures and decreased humidity.

b. AR 95-1 specifies the flight uniform requirements for aircrews. TC 1-210 specifies safety requirements for MOPP training. Aviators not on the controls must recognize when aviators on the controls begin to lose concentration so that they can take control of the aircraft. Every individual has a different physiological makeup; therefore, commanders should not expect every crew member to progress at the same rate.

c. Overall physical conditioning plays an important role in an individual's ability to perform in MOPP gear. Commanders should ensure that their units pursue an aggressive and challenging program of physical training along with MOPP training.

Appendix E

SUPPRESSION OF ENEMY AIR DEFENSE

Modern air defense systems, deployed with mass and mix, require aviation elements to apply the concepts and procedures for effective suppression. Within the context of AirLand Battle doctrine, suppression of enemy air defense integrates the capabilities of Army and Air Force systems and tactics. Whether fighting with Army assets or with Air Force elements, ATKHBs perform suppression as outlined in TRADOC TT 100-44-1. Suppression of enemy air defenses is any activity that neutralizes, destroys, or temporarily degrades enemy air defense systems in a specific area to enable air operations to be conducted. SEAD may require joint interaction to suppress enemy surface-to-air defense systems that have an influence on the battlefield.

E-1. DEFINITIONS

All participants in planning and executing SEAD must be aware of the definitions of suppression, neutralization, and destruction which are related to target effects.

a. Suppression. Suppression limits the ability of enemy personnel and equipment to acquire and engage a target. In this sense, the effects of suppressive fires are temporary, lasting only as long as the suppression technique continues. Suppression may include obscuration, direct fires, indirect fires, and electronic means.

b. Neutralization. Neutralization removes a target or a unit from the battle temporarily. Although mobility or firepower is gone, the target may be repairable.

c. Destruction. Destruction of a target is permanent or not repairable.

E-2. CATEGORIES OF SUPPRESSION

SEAD doctrine organizes suppression by scope into three categories--campaign, localized, and complementary. Whatever the category, SEAD conforms to the organization and procedures of the Army air-ground system and the tactical air control system.

a. Campaign. Campaign-level operations are theaterwide efforts conducted along with other air and ground campaigns. Campaign SEAD is conducted against specific SAM systems concurrently with localized SEAD operations. Campaign-level operations are conducted to suppress, neutralize, or destroy long-range SAM systems, ADA radars, and associated C³I systems. These targets are usually limited in number but may influence wide areas, often on both sides of the FLOT. They are suppressed to degrade the enemy's ability to interfere with friendly use of airspace. The initial SEAD campaign is planned before hostilities begin. It will normally be conducted in the first days of the conflict. Campaign-level SEAD is planned and conducted by the joint force command and may involve Army assets from two or more corps.

b. Localized. Localized SEAD operations are confined to geographic areas associated with specific ground targets. The main objective of localized operations is to increase the effectiveness of the attacking air systems. Localized SEAD is planned by the Air Force TACS and the Army air-ground system. Localized SEAD operations may be conducted by Army elements from within one corps.

c. Complementary. The campaign and localized levels of SEAD are based on known or suspected threats to air operations. Many surface-to-air threats may not be detected in time to plan suppression. These threats fall into the complementary suppression category, in which the ATKHB and ATKHC will be most active. It includes engagements in self-defense and attacks against targets of opportunity. The dynamic nature of AirLand Battle doctrine and the mobility of enemy air defense systems make it imperative that commanders include SEAD in their mission planning. When the need for complementary suppression is probable, planning should include--

- Planning and coordinating the use of indirect fire assets for SEAD.
- Using EW assets to locate, target, jam, and deceive enemy ADA assets.
- Considering the enemy air defense system distribution and employment doctrine.
- Assessing, through the use of IPBs, the number and type of threats that are likely to be encountered during an attack.
- Selecting the weapon and armament mix to accomplish the primary mission while allowing effective suppression capabilities.

Complementary suppression efforts by ATKHBs develop from two primary situations, which are requirements of self-defense and targets of opportunity.

(1) Self-defense. Aircrews have the inherent right of self-defense; it is never withheld. They use weapons and tactics in self-defense when under imminent or actual attack by enemy air defenses.

(2) Targets of opportunity. These targets are likely to include short- and medium-range air defenses, electronic countermeasures, acquisition radars, and air defense C³ systems supporting regiments and divisions. Army and Air Force elements suppress these targets of opportunity whenever capabilities, mission priorities, and rules of engagement permit.

E-3. RULES OF ENGAGEMENT

Rules of engagement are organized in relation to battlefield boundaries, primarily the FLOT and the fire support coordination line. Between the FLOT and the FSCL, elements may attack without additional coordination only if

certain criteria are met. The right of self-defense prevails. The criteria for engaging targets of opportunity are as follows:

- The target is not in a no-fire area.
- Target acquisition is confirmed visually or by sensors.
- Ordnance and its effects are confined to the immediate vicinity of the target.
- No current prohibitions in the ATO or instructions issued by air or ground commanders or any controlling agency.

Beyond the FSCL, elements may conduct attacks unless they are specifically prohibited in the ATO or by the controlling agency.

E-4. EXECUTION RESPONSIBILITIES

The Army has primary responsibility for executing SEAD from the FLOT to the limits of observed fire; the Air Force has secondary responsibility in this area. The Air Force has primary responsibility for executing SEAD from the limits of observed fire to the limits of Army unobserved indirect fires; the Army has secondary responsibility in this area. Beyond the limits of Army unobserved indirect fire, the Air Force has primary responsibility but Army surface-to-surface systems may be used to complement Air Force suppression in these deep areas.

E-5. SUPPRESSION MEANS

If the Threat's air defense objective is to prevent air power from attacking ground forces, successful SEAD has a high payoff. Working together, Army and Air Force elements each complement the limitation of the other. Their joint effect becomes greater than the total effect of each operating independently. The various Army and Air Force means of suppression are employed secretly. The selection of specific means is based on mission objectives, complexity of the suppression requirement, and capability of available suppression systems. Selective employment helps prevent overkill and preserves unity of effort. The suppression effort may involve destructive means, disruptive means, or a combination.

a. Destructive. In destructive means, weapons are used to destroy, neutralize, or suppress air defense systems, to include equipment and personnel. The effects of destructive means may accumulate over time until destroyed targets are replaced or neutralized units are reconstituted. Until suppressive fires are lifted or shifted, suppression with destructive means may be only temporary. Reliance on destructive means alone places a large demand on firepower. To preserve firepower for the main objective, destructive, one-time weapons must be integrated with reusable resources.

b. Disruptive. The effects of disruptive means are temporary. When applied against Threat air defense equipment and personnel, it may be used to

degrade, deceive, delay, or neutralize. Within the array of disruptive means, systems and measures may be passive or active.

(1) Passive disruptive means include countermeasures that can degrade, delay, or disrupt by denying the enemy the ability to acquire, track, or fire. These means include the use of camouflage, infrared shielding, radar warning receivers, and other ASE measures.

(2) Active disruptive means include equipment and procedures related to jamming, chaff, flares, and planned deception and avoidance.

c. Combination. Whatever combination is feasible and effective, destructive and disruptive means complement each other. Both must be planned and are used during training and operations to conduct an effective SEAD program. Active and passive means are used jointly--

- To degrade jammable threats.
- To temporarily degrade or neutralize targets to make destruction feasible and effective.
- To temporarily degrade, suppress, or neutralize targets when destruction is not feasible or possible.
- To sustain the effects of destructive neutralization by slowing enemy attempts to restore effective air defense.

E-6. PLANNING AND COORDINATION

ATKHB commanders and staff officers at battalion level and above must be thoroughly familiar with campaign and localized SEAD responsibilities and procedures. These are given in TRADOC TT 100-44-1. At brigade level and below, the ATKHB commander or the LNO with the ground maneuver element's staff is directly involved in planning, coordinating, and executing SEAD. ATKHB staff sections, particularly the S2, S3, and S4, may become directly involved in preparing and executing campaign and localized SEAD actions. All personnel involved in the SEAD process must be thoroughly familiar and skilled in applying the SEAD concept and procedures. Whenever possible, these procedures should be incorporated in single-service and joint combined arms force-on-force exercises, CPXs, and other training programs.

Appendix F

MOVEMENT

Unlike other forces, attack helicopter (AH-64) battalions have limited self-deployment capabilities. With preparation, the ATKHB can self-deploy aircraft, personnel, and equipment from CONUS stations to almost any place in the world, which allows other transport assets to be used more efficiently. Units that plan, train, and validate their movement plans greatly increase their chances of success. The more knowledgeable personnel are of movement plans and operations, the more efficient the move becomes.

F-1. FUNDAMENTALS

a. An ATKHB begins training for its combat mission from the time it is activated. It deploys to a point where it can best accomplish the mission. Unit deployment training is necessary if the ATKHB is to move in the most efficient manner. If it cannot move within its operational requirements, whether it deploys from CONUS or 3 kilometers on the battlefield, the success of the mission is jeopardized.

b. The ATKHB is only as effective as its logistical support. Equipment used to support and sustain the battalion is organic to the unit. To facilitate rapid response, effectiveness, and sustained operations, logistical support must be transported using the battalion's organic equipment. Therefore, units must be organized with the necessary assets to transport their logistical support in a single move.

c. The unit must give careful consideration to prestocking shipping containers for aircraft components and covers. This ensures that items are available and precludes delays in unit deployment. Units prepare and on- and off-load aircraft and equipment; therefore, predeployment ground-handling equipment will save time. Fulfilling the requirement for tools and test equipment at the ports of embarkation and debarkation also results in more effective unit movements.

F-2. RESPONSIBILITIES

a. Commanders. Commanders are responsible for the movement of their unit personnel and equipment. They also--

- Appoint a unit movement officer.
- Supervise the operations of subordinate units.
- Establish policies for air and sea lines of communication.
- Ensure compliance with directives, policies, and regulations.

- Review and validate movement plans, SOPs, and load plans frequently.
 - Coordinate with other headquarters for technical data and logistical support.
- b. Staffs. Staffs ensure compliance with the commander's directives and develop unit movement plans. They also--
- Plan and supervise unit movement training.
 - Make recommendations for improvement to the commander.
 - Establish training programs for unit movement personnel.
 - Determine and coordinate logistical support requirements.
 - Ensure compliance with directives, policies, and regulations.
 - Ensure that subordinate unit movement plans, load plans, and SOPs are accurate and current.
- c. Unit Movement Personnel. These personnel plan and conduct unit moves. They also--
- Develop unit movement plans, SOPs, and load plans.
 - Conduct unit movement training.
 - Ensure that proper support and logistical requirements are requested.
 - Validate movement plans.
 - Inspect and inventory equipment before and after a unit movement.
 - Ensure proper preparation of personnel and equipment before a unit movement.

F-3. PLANNING AND PREPARATION

The ATKHB must plan and prepare to arrive at a designated location in the area of operations and begin battlefield missions. Modes of movement and deployment are designated in orders. These orders are delivered in several formats such as an OPORD, a FRAGO, or a movement order. Because of the complexity of unit movements, the movement order is preferable. Movement orders provide detailed information such as transportation support, movement tables, and clearance numbers. The least preferred format is the FRAGO. The information below will assist planners in preparing movement directives and SOPs.

a. Movement Directive. The movement directive, published by DA, is the basic document that directs units to prepare to and move from home stations. The two types of moves are administrative and tactical. In an administrative

move, enemy contact is not likely and units relocate to secure areas and ports of embarkation. The S4 has staff responsibility for administrative movements. A tactical move, however, requires a combat-ready posture and organization during all phases even though the purpose of the move is to relocate only. The G3 or S3 has staff responsibility for tactical moves. Movements are categorized as follows:

(1) Category A--a move from a home station with all the equipment authorized for that unit.

(2) Category B--a move from a home station with essential equipment only.

(3) Category C--a move from a home station with less than essential equipment. (The movement directive will specify what equipment to take.)

b. Movement Instructions. Movement instructions provide details for the execution of a movement. They are issued to implement the movement program and represent accepted procedures.

c. Movement Order. The movement order directs the movement of personnel and prescribed equipment from one location to another within a stated period.

d. Movement Plan. The movement plan provides up-to-date logistical data. This data reflects a summary of transportation requirements, priorities, and limiting factors incident to the movement of one or more units or special grouping of personnel by highway, marine, rail, or air transportation. Figure F-1 shows a sample movement plan.

e. Load Plan. The load plan is a preplanned method for loading personnel and equipment for transport.

F-4. SELF-DEPLOYMENT

Because airlift and sealift assets are limited, selected ATKHBs should plan to self-deploy. AH-64 aircraft will be equipped with the necessary fuel, ALSE, and navigation and communication systems needed to conduct self-deployment operations. They will move from CONUS stations to designated departure points where the preparation of the aircraft will occur. Pre-stationed ground and aerial support and maintenance teams provide stopover point assistance. When self-deployed flights arrive at destination points, ferry equipment will be removed and arrangements made for its return and reuse. Self-deployment applies only to aircraft transferred when other transportation assets are not provided; and these aircraft may provide the transport of a small amount of equipment and/or personnel. The command structure must integrate self-deploying aircraft and crews into the theater of operations. This will expedite the availability and effectiveness of these aviation assets at their operational area.

HQ, 112th ATKHB
Fort Rucker, AL 36362

TRANSPORTATION MOVEMENT PLAN 1-84

References: OPLANs 0001Q and 4102P

Task Organization.

HHC, Fort Rucker, AL
Co A, Electric, AL
Co B, Birmingham, AL
Co C, South Side, AL

1. Situation

- a. Enemy forces. Current INTSUM.
- b. Friendly forces. Task organization.
- c. Assumptions.
 - (1) All unit equipment will be combat serviceable.
 - (2) All unit personnel will be available for movement.

2. Mission

On order, move to Fort Gordon, Georgia, for training, POR qualification, and movement to a designated theater of operations.

3. Execution

- a. Concept of the operation.
 - (1) On M day, the commander in chief will sign the mobilization order, federalizing the unit. The order will be transmitted through command channels to the unit. N-hour sequence begins upon receipt of the mobilization order.
 - (2) Within two hours of receipt of the mobilization order, the unit will assemble at the unit headquarters and prepare to move to the mobilization station.
 - (3) On M+1, the unit will move to the mobilization station.

Figure F-1. Suggested format for a movement plan

b. Deployment to the theater of operation is covered by--

(1) OPLAN 0001Q. See Movement Plan 2-84.

(2) OPLAN 4102P. See Movement Plan 3-84.

4. Service Support

a. Supply.

(1) Class I.

(2) Class II.

(3) Class III.

(4) Class IV.

(5) Class V.

(6) Class VI. Not authorized during mobilization.

(7) Class VII.

(8) Class VIII.

(9) Class IX.

(10) Class X. Not authorized during mobilization.

b. Maintenance.

(1) Premovement support requirements.

(2) En route support requirements.

c. Transportation.

(1) Air.

(2) Convoy.

(3) Rail.

(4) Commercial.

(5) Unit movement data.

Figure F-1.^e Suggested format for a movement plan (continued)

d. Procurement.

e. Facilities.

f. Other.

(1) Points of contact.

(2) Other.

g. Personnel.

(1) Personnel. Current SIDPERS.

(2) Morale.

(3) Maintenance of law, order, and discipline.

5. Command and Signal

a. Command.

b. Signal. Current SOI in effect.

c. N-hour sequence.

1. (This sample coordination portion of a movement plan is developed for installation use in premobilization planning and postmobilization execution of convoy movement from HS to MS or POE. Installation headquarters may use this form to indicate concurrence or coordination with and approval of the movement plan. If more space is required for coordinating instructions, attach a continuation sheet, indicating the headquarters and unit, with additional information.)

2. Coordinating HQ:

Unit:

Coordinating HQ POC:

Phone Number:

Planned Departure From HS: M+ _____ at _____ hours, to arrive at MS or POE on M+ _____ at _____ hours.

Crossing times into states (list in order of crossing):

State: on M+ _____ at _____ hours, Route _____;

State: on M+ _____ at _____ hours, Route _____;

State: on M+ _____ at _____ hours, Route _____;

State: On M+ _____ at _____ hours, Route _____.

Unit will use _____ buses to be coordinated by the ITO at _____.
Coordinating instructions and special considerations.

Figure F-1. Suggested format for a movement plan (continued)

F-5. AIRLIFT

a. An airlift is an operation executed according to prepared plans designed to ensure air transport of supplies, equipment, and personnel. The mobile capability of the ATKHB requires that it be able to package, document, on- and off-load, and tie-down equipment. Therefore, the ATKHB must be trained not only in mission accomplishment but also in the skill and execution of airlift deployment. Emergency situations require rapid response by the armed forces; air movement fulfills that requirement.

b. The Military Airlift Command provides the strategic air assets necessary to move personnel and materiel during emergencies or for operational necessities. Although MAC aircraft are located around the world, they are limited in number and availability. Equipment accepted on MAC aircraft must be within specified space and weight limits. Table F-1 shows an airlift loading chart.

Table F-1. Airlift loading chart									
Type	C-5 ¹						C-141 ¹		
	Minimum Disassembly			Optimum Transport ²			Optimum Transport ²		
	No	Man- Hours	Elapsed Time (Hours)	No	Man- Hours	Elapsed Time (Hours)	No	Man- Hours	Elapsed Time (Hours)
AH-1	12	18.0	3.0	15	24.0	4.0	4	0.5	0.5
UH-1	8	12.0	2.0	11	18.0	3.0	4	0.5	0.5
OH-58A/C	13	19.5	3.5	22	33.0	5.5	6	9.0	1.5
AH-64 ³	6	7.0	1.0	6	7	1	8	12.0	2.0
UH-60	6	2.0	0.75	Not available			2	18.0	3.0
OH-58D ⁴							2	5.0	1.5
NOTES: 1. Six-man loading crews. 2. Number of aircraft that can be transported with further disassembly if flyaway condition is not required on arrival. 3. Approximate figures. 4. Similar to OH-58A/C. However, the MMS must be removed so man-hours and elapsed time will increase.									

c. The unit movement officer is the key to exercising the unit's movement and loading plans. He supervises and conducts training and maintains updated movement data. Because operational requirements may exceed

the airlift capacity, the unit movement officer also plans for the use of other types of transportation to conduct the air movement. Detailed information on unit movement planning is in FM 55-9.

d. Specific planning and support requirements for each unit vary. In an emergency, little time is available for planning. Therefore, the unit movement officer routinely identifies requirements and develops and validates exercise plans to preclude difficulties.

F-6. RAIL MOVEMENT

a. The division or installation transportation officer or DISCOM movement control officer assists movement officers' plan and identify unit rail-loading requirements. He provides training material and current procedures for transporting equipment as well as other information to minimize planning time.

b. When available, rail shipment is used to move heavy and outsized items to the port of embarkation. Rail shipment can, however, damage sensitive aircraft components; therefore, this type of equipment must be airlifted.

c. As with other forms of movement, the aviation unit is responsible for internal administration and preparation of unit assets for rail movement. Plans and SOPs will address all rail requirements such as loading, tie-downs, organization, and specific safety provisions. Rail movement plans are completed as required by the controlling transportation agency.

d. The information in FM 55-20 will assist the unit movement officer in planning and preparing equipment for rail transport. This manual also provides background information on special movement requirements imposed by foreign countries.

F-7. SEALIFT

Because of the many types of merchant vessels, units can perform only minimum sealift planning and training. Planning and training is limited to on-site surveys and data about the out-loading installation, ports of embarkation and debarkation and, to a limited extent, vessels that are likely to be employed. The deploying unit will have to prepare accurate cargo-loading movement data. However, higher headquarters should provide guidance and assistance in sealift planning.

F-8. ROAD MARCH

a. Types. The movement of troops from one location to another is inherent in any phase of a military operation. A common form of troop movement is the road march. Road marches may be tactical or nontactical, depending on the enemy situation.

(1) Tactical movement. When contact with the enemy is possible, a unit will conduct a tactical movement. For example, if troops move forward

to participate in combat operations, the movement is tactical. The squadron S3 plans tactical movements.

(2) Nontactical movement. If contact with the enemy is unlikely, a unit will conduct a nontactical movement. Movement in the communications zone to reposition laterally or to ease future operations is nontactical. The squadron S4 may plan nontactical movements.

b. Organization.

(1) March columns are organized to maintain unit integrity. In a tactical march column, all elements use the same route for a single movement and are under the control of a single commander. A large column may be composed of a number of subdivisions.

(a) Serial. A serial is a major subdivision of a march column. For purposes of planning, regulation, and control, it is organized as a single unit under one commander. An ATKHB is usually one serial.

(b) March unit. A march unit is a subdivision of a serial and is normally a squad, section, platoon, or troop. It moves and halts under the control of a single commander, using oral and visual signals. A radio is used only when no other means of communication can be used. March units of the main body are composed of individual units, any attachments, the battalion main CP, and the battalion trains. POL vehicles required for refueling during nontactical marches may move ahead of schedule to establish a forward refueling point.

(2) March columns, regardless of size, are composed of four elements. These elements are the reconnaissance party, the quartering party, the main body, and the trail party. Figure F-2 shows the organization of a squadron tactical road march.

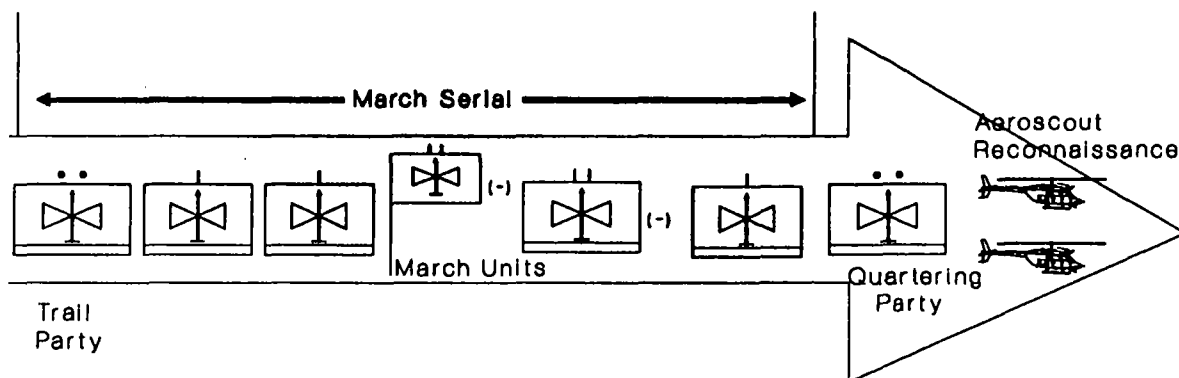


Figure F-2. Organization of a battalion tactical road march.

c. Planning Process.

(1) Tactical road marches require extensive planning. Commanders and staffs use the estimate process to determine how to best execute a move from one point to another. Road-march planning consists of three concurrent steps. These steps are to determine requirements for the move, analyze organic and nonorganic movement capabilities, and establish unit movement priorities. During movement planning, the battalion commander and staff must consider the--

- Enemy situation and capabilities, terrain conditions, and weather.
- Organization of the ATKHB.
- Security measures to be taken before the movement, during movement, and at the destination.
- Assembly of the march units.
- Loading of personnel and equipment.
- Actions at the destination.

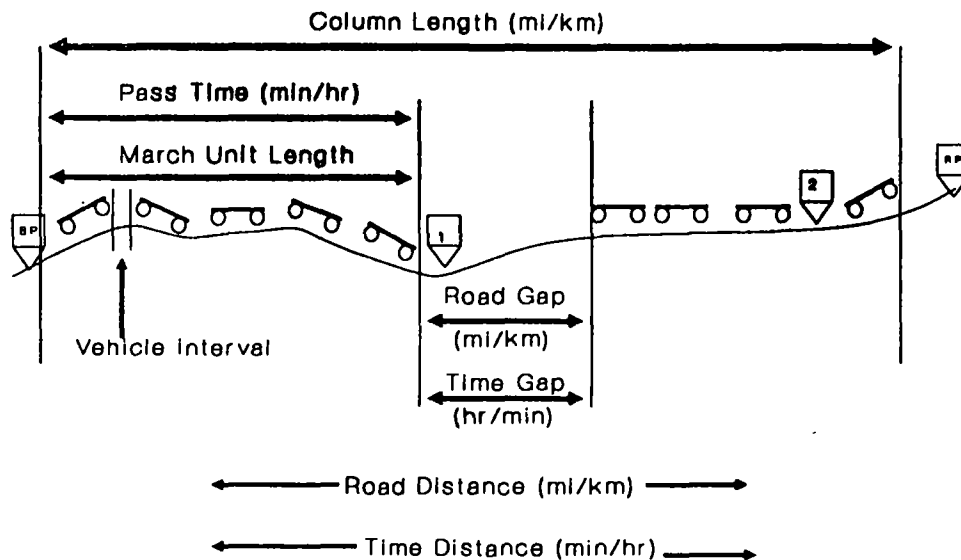
(2) When the ATKHB prepares for a tactical road march, the sequence of planning for the march (if time permits) is--

- Prepare and issue an oral warning order as early as possible to allow subordinates time to prepare for the march.
- Prepare an estimate of the situation, analyze routes designated by the brigade, and specify the organization of the march serial..
- Prepare and issue the march order.
- Prepare detailed movement plans and assembly area plans.
- Organize and dispatch reconnaissance and quartering parties as required.

d. Planning Factors. Planners apply movement formulas to known distance, rate, and time data to derive information necessary to prepare a time schedule. The time schedule requires departures and arrivals of march elements.

(1) Time and distance relationships. Relationships between time and distance are the basis for march planning. Planners determine how far the column is to travel (distance) and how long it will take to make the move (time). They must also know how much space (length of column) the column will occupy on the route and the distance (road gap) or time (time gap) that separates march columns and their elements. Each term used for distance has a corresponding term for time. The length of a column in kilometers has an equivalent pass time in minutes; the road distance in kilometers or miles has

a corresponding time distance. Relationships between time and distance in the average rate of march are shown in Figure F-3.



$$\text{Clearance Time} = \text{Time} \times \text{Distance (TDIS)} + \text{Pass Time (PST)}$$

Figure F-3. Time and distance relationships

(2) Distance factors. Distance factors include vehicle interval, column gap, traffic density, column length, and road gap. These factors are defined below.

(a) Vehicle interval is the distance between two consecutive vehicles of an organized element of a column.

(b) Column gap is the space between two organized elements following each other on the same route. It can be calculated in units of length (road gap) or in units of time (time gap) as measured from the rear of the leading element to the front of the following element.

(c) Traffic density is the average number of vehicles that occupy 1 mile or 1 kilometer of road space, expressed in vehicles per mile or vehicles per kilometer.

(d) Length of a column is the length of roadway occupied by a column, including gaps in the column measured from the first vehicle to the last vehicle.

(e) Road gap is the distance between two march elements. It is the length aspect of the column gap. Since a road gap is more significant

when the column is moving than when the column is halted, it becomes a factor of time rather than distance.

(3) Rate factors. Speed, pace, and rate of march are rate factors. The definitions of these factors follow.

(a) Speed is the velocity of a vehicle at a given moment as shown on the speedometer (in kilometers per hour or miles per hour).

(b) Pace is the regulated speed of a column or element. It is set by the lead vehicle or an individual in the lead element to maintain the prescribed average speed.

(c) Rate of march is the average number of miles or kilometers traveled in any given period. It includes short periodic halts and other short delays. The rate of march is expressed as miles or kilometers traveled in an hour.

(4) Time factors. Time factors include arrival time, clearance time, completion time, and pass time. Others are extra time allowance, time distance, road clearance time, and time gap.

(a) Arrival time is the moment when the head of the column arrives at a designated point or line.

(b) Clearance time is the moment when the head of the column arrives at a designated point or line.

(c) Completion time is the moment when the tail of a column passes the release point.

(d) Pass time is the time between the moment the first element of a column passes a given point and the moment the last element passes the same point.

(e) Extra time allowance of one minute per 25 vehicles is always allotted above the calculated pass time within a motor march column moving under one identification serial number. For a column that has more than 600 vehicles, the EXTAL is two minutes per 25 vehicles. If a column has less than 25 vehicles, no extra time is allotted. An EXTAL is equitably added to march unit pass time within a serial.

(f) Time-distance is the time required to move from one point to another at a given rate of march. Time-distance normally represents the movement of the head of the column from the start point to the release point.

(g) Road clearance time is the total time a column requires to travel over and clear a section of road. Road clearance time equals time distance plus column pass time.

(h) Time gap is the time measured between the rear and front of successive elements as they move past any given point. Time gap is the time

aspect of column gap and may also be the conversion of road gap to time. There are no prescribed standard gaps. Gaps depend on the size of serials and march units, the time available for the movement, and the tactics required for protection against air and nuclear attack.

e. Movement Formula Application.

This paragraph implements portions of STANAG 2041.

(1) Distance, rate, and time are the basic factors for movement computations. If the march planner knows two of these factors, he can easily determine the third by dividing or multiplying one by the other. The movement formulas are--

- Determine rate by dividing distance by time: $R = \frac{D}{T}$.
- Determine distance by multiplying rate by time: $D = R \times T$.
- Determine time by dividing distance by rate: $T = \frac{D}{R}$.

(2) The march planner must determine time-distance, pass time, arrival time, and completion time. The procedures for determining these factors are given below.

(a) Time-distance. Time-distance is determined by dividing distance to be traveled by rate of march (Figure F-4). TDIS does not include time for long delays or extended scheduled halts. A time-distance table (Figure F-5) is a valuable tool to the march planner. It provides a listing of factors used to calculate the time required to travel certain distances at specified speeds. Travel rates are expressed in speeds and corresponding rates of march. Travel factors are derived from rate of march, which includes time for short, periodic halts and other minor delays that might occur.

$$TDIS = \frac{\text{DISTANCE (miles or km)}}{\text{RATE OF MARCH (mih or kmih)}}$$

EXAMPLE: Determine TDIS of a serial traveling 135 kilometers at a speed of 24 kmph (rate of march 20 kmih).

$$TDIS = \frac{135 \text{ (km)}}{20 \text{ (kmih)}} = 6.75 \text{ hours} \quad \begin{array}{l} 0.75 \text{ (fraction)} \\ \times 60 \text{ (minutes)} \\ 45.00 \text{ (minutes)} \end{array}$$

TDIS = 6 hours and 45 minutes

Figure F-4. Time-distance formula

SPEED (miles/kilometers per hour)	RATE OF MARCH (miles/kilometers in the hour)	MINUTES TO TRAVEL 1 KILOMETER	MINUTES TO TRAVEL 1 MILE
10 mph 16 kmph	8 mih 12 kmih	5	7.5
15 mph 24 kmph	12 mih 20 kmih	3	5
20 mph 32 kmph	16 mih 25 kmih	2.4	3.75
25 mph 40 kmph	20 mih 32 kmih	1.84	3
30 mph 48 kmph	25 mih 40 kmih	1.5	2.4
35 mph 56 kmph	30 mih 46 kmih	1.3	2
40 mph 65 kmph	33 mih 53 kmih	1.13	1.8

Figure F-5. Time-distance table

(b) Pass time. Pass time for a serial is determined by adding march unit pass times together, including time gaps between march units (Figure F-6).

PST = $\frac{\text{NO OF VEH} \times 60}{\text{DENSITY} \times \text{SPEED}} + \frac{\text{NO OF VEH}}{25} = \text{TIME GAPS (Min)}$

EXAMPLE: Determine PST of a *serial* of 150 vehicles organized into 6 march units of 25 vehicles each, traveling at a speed of 24 kmph, with a density of 15 VPK, and using a 2-minute time gap between march units.

PST = $\frac{150 \times 60}{15 \times 24} + \frac{150}{25} + (2 \times 5) = \frac{9000}{360} + 6 + 10 = 25 + 6 + 10$

PST = 41 minutes

NOTES: 1. Round off fractions of minutes to next higher minute.

2. EXTAL is allocated on the basis of 1 minute per 25 vehicles added to serial pass time. EXTAL is equitably added to pass time of each march unit in the serial.

Figure F-6. Pass time formula

(c) Arrival time. In march planning, the release point is normally designated as the terminal point of movement. Arrival time at the release point is determined by adding time-distance and any scheduled halts to the start-point time (Figure F-7).

	<u>Hours</u>	<u>Minutes</u>
SP TIME	08	00
TIME-DISTANCE	6	45
SCHEDULED HALT	<u>1</u>	<u>00</u>
	15	45
ARRIVAL TIME IS 1545 HOURS.		

Figure F-7. Arrival time formula

(d) Completion time. Completion time is calculated by adding pass time to the arrival time or by adding to the start-point time the distance, pass time, and any scheduled halts.

f. March Order.

(1) The march order format is the same for tactical and nontactical movements. The march order is prepared either as an annex to an OPORD, a separate OPORD, or a FRAGO. Figure F-8 shows an example of an OPORD for a road march.

(2) The march order should include, as a minimum, a strip map. A strip map is a sketch of the route of march. It is normally included as an annex to the march order. Figure F-9 shows an example of a strip map. The amount of detail on the strip map depends on its intended purpose and the unit level at which it is prepared. The map should identify critical points, start-point and release-point times and locations, order of march, maximum catch-up speed, distances to be maintained between vehicles and units, assembly area locations, and instructions on future operations. In designating distance (interval) or density, the planner must know its effect on column length and the time required to move.

(Classification)

Copy no ____ of ____ Copies
112th ATKHB
GAY (GL645745)
211600Z Aug 19__
EEL

OPORD 31

Reference: Map, JOG, NH 16-2, 1:250,000, 1st Edition.

Time Zone Used Throughout the Order: ZULU

Task Organization: Annex B (Road Movement Table).

1. Situation

a. Enemy Forces. Current INTSUM.

b. Friendly Forces. Aviation Brigade moves 221000 Aug to assembly area vicinity FARGO (GN7512).

c. Attachments and Detachments. 2/B/31st AD and 1/A/52d Engr attached effective 220430 Aug.

2. Mission

112th ATKHB moves to assembly area vicinity FARGO (GN7512); SP (GL6672) 221159 Aug; closes on the assembly area by 221930 Aug.

3. Execution

a. Concept of Operation. Annex A (Route Overlay). I intend to close assembly area during daylight. BN conducts a motor march, in six march units via Route RED, first march unit crossing SP at 221159 Aug and last march unit clearing the release point, vicinity FARGO, by 221830 Aug.

(Classification)

Figure F-8. Sample format for a road movement order

(Classification)

- b. March Unit 1:
- c. March Unit 2:
- d. March Unit 3:
- e. March Unit 4:
- f. March Unit 5:
- g. March Unit 6:
- h. Coordinating Instructions.

- (1) Annex B (Road Movement Table).
- (2) Quartering party assemble at Main CP at 220900 Aug.
- (3) Vehicle density: open column; 12 vehicles per kilometer.
- (4) Rate of march: 24 kilometers per hour.
- (5) Time gap: Five minutes between march units.
- (6) Vehicle bumper markings will be covered.

4. Service support

- a. Supply. Each man draw two MREs at breakfast for noon and evening meals on 22 Aug.
- b. Services. Trail party task force control.

(Classification)

Figure F-8. Sample format for a road movement order (continued)

(Unclassified)
Annex A (Strip Map) to OPOD 10-112 ATKHB

Reference: Map, series M1988,
Sheet MM 55-0 (Lich en Bler)
Edition II, 1:250,000
Time zone used throughout order: Zulu

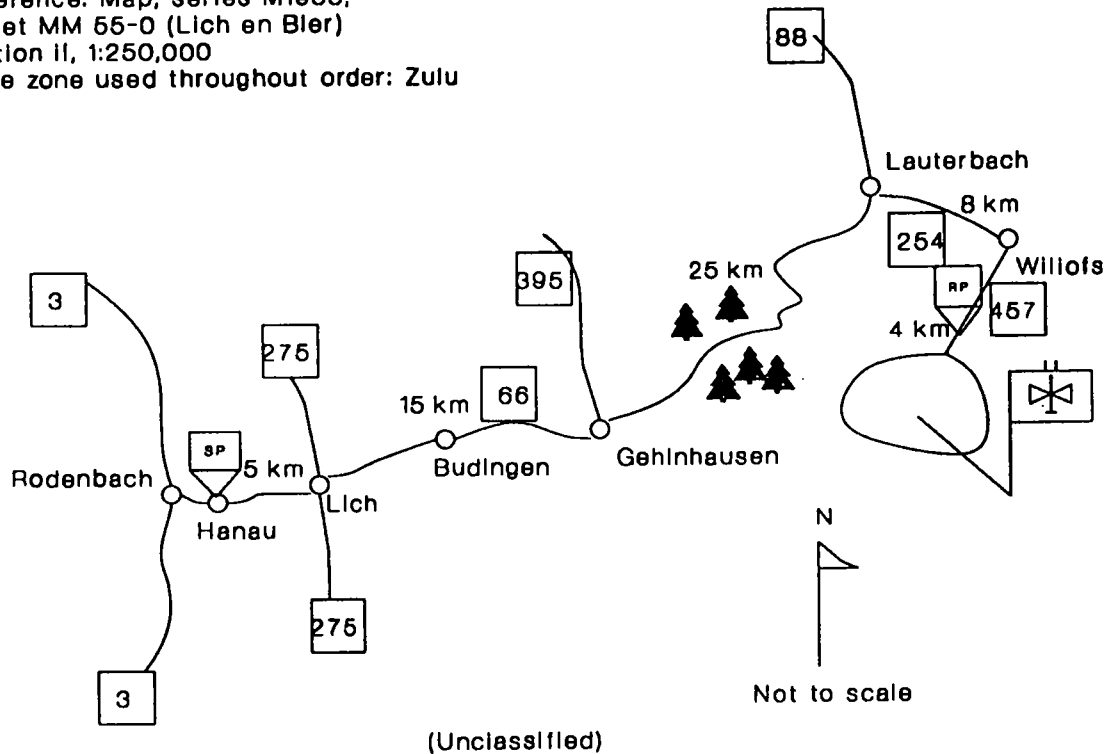


Figure F-9. Strip map

(3) The march order also contains a statement of the enemy situation, the weather, and visibility conditions. It should also contain (if applicable)--

- Road restrictions and information derived from route reconnaissance.
- Actions on enemy contact (ground and air).
- Actions at halts and actions for disabled vehicles.
- Actions in the assembly area.
- Procedures for resupply, maintenance, and feeding.
- Location of leaders and a communications plan.

(4) Much of the information needed to conduct the march should be in the unit SOP. Only exceptions to the SOP should be stated in the march order.

g. Road Movement Table.

(1) A road movement table is normally an annex to a movement order as shown in Figure F-10. It is a convenient means of transmitting to subordinate units time schedules and other essential details of the move. It is particularly useful when the inclusion of such details in the operation order would make the order complicated or unduly long. Road movement tables consist of two parts. The first part contains data paragraphs that reflect information common to two or more march elements. The second part contains a list of serials or march units along with all other necessary information arranged in tabular form.

(2) The march planner must know the times at which serials and march units arrive at and clear critical points. Other information in the road movement table includes serial or march unit number, date of move, units involved, number of vehicles, and load class of the heaviest vehicle routes to be used. A remarks section should reflect any details not covered elsewhere.

h. March Procedures.

(1) Reconnaissance party. An ATKHB, augmented by engineer and other CS assets, conducts a route reconnaissance to determine travel time, capacities of underpasses and bridges, and locations of ferries and fords. The aeroscout platoon also identifies critical points, including choke points and obstacles. Route reconnaissance confirms and supplements data from map studies, higher headquarters, and air reconnaissance. Instructions to the aeroscout platoon should include the nature and extent of the required information and the time and place the report is to be submitted.

(Classification)

Annex B (Road Movement Table) to OPORD 31

Reference: Map, JOG, NH 16-2, 1:250,000, 1st Edition.

Time Zone Used Throughout the Order: Zulu.

General Data:

1. Average Speed: 24 kilometers per hour.
2. Traffic Density: 12 vehicles per hour.
3. Halts: 1545-1645, meal and fuel; all others SOP.
4. Critical Points: Route RED.
 - a. Start point: BOLL WEEVIL (GL6672).
 - b. Release point: FRAGO (GN7512).
 - c. Other critical points: COLUMBIA (GL6979), DURHAM (GL6989), NIAGARA (GL6893), and BOSTON (GN7106).
 - d. Route Classification: 10X50.
 - e. Route Restriction: None.
5. Main Routes to Start Point: NA.
6. Main Routes to Release Point: NA.

(Classification)

Figure F-10. Sample format for a road movement table

(2) Quartering party. The quartering party consists of the quartering parties of each of the companies. The commander dispatches a quartering party to reconnoiter the new area and guide march elements into position.

(3) Main body.

(a) Before starting a march, each march unit of a serial reconnoiters its route to the start point and determines the exact time required to reach it. The movement order states the time that the serial will arrive at and clear its start point. The serial commander then determines and announces the times for march units of his serial to arrive at and clear the start point. Arrival time at the start point is critical. Each march unit must arrive at and clear the start point on time; otherwise, movement of other elements may be delayed.

(b) During the movement, march units move at the constant speed designated in the order, maintaining proper interval and column gap. Elements in a column of any length may simultaneously encounter many different types of routes and obstacles. As a result, different parts of the column may move at different speeds at the same time. This can produce an undesirable accordion-like action or "whip effect." The movement order gives march speed, rate of march, and maximum catch-up speed to ensure safety and to reduce column whipping. March units report crossing each control point as directed by the march order. During the move, air and ground security are maintained.

(4) Trail party. The trail party is normally made up of elements of the HHC maintenance platoon and is the last unit in a task force serial. The trail party is led by the battalion movement officer. Its function is to recover disabled vehicles. If a vehicle cannot be repaired or towed, the vehicle and its crew are moved off the road into a secure area. Crew members are given sufficient food and water and left with the vehicle. When vehicles are left behind, the BMO reports their locations and the reason they were left behind to the task force S4. Once the trail party completes the road march, maintenance priority becomes recovery of disabled vehicles. A tactical road march is not complete until all march units and vehicles arrive at their destination.

i. March Techniques.

(1) Close column. In a close column, vehicles are spaced about 20 to 25 meters apart during daylight hours. At night, vehicles are spaced so that each driver can see the two lights in the blackout marker of the vehicle ahead. A close column is normally used for marches during the hours of darkness under blackout driving conditions. This method of marching takes maximum advantage of the traffic capacity of the route but provides little dispersion. Normally, vehicle density is about 30 vehicles per kilometer along the route.

(2) Open column. In an open column, the distance between vehicles is increased to provide greater dispersion. The distance between vehicles varies from 50 to 100 meters, but may be greater if required. An open column

is normally used during daylight. It may also be used at night using infrared lights, blackout lights, or passive night-vision equipment. Vehicle density varies from 10 to 15 vehicles per kilometer.

(3) Infiltration. During a move by infiltration, vehicles are dispatched individually, in small groups, or at irregular intervals at a rate that will keep the traffic density down and prevent undue massing of vehicles. Infiltration provides the best possible passive defense against enemy observation and attack. It is suited for tactical marches when sufficient time and road space are available and when maximum security, deception, and dispersion are desired.

j. Control Measures.

(1) Critical point. Critical points on a route are those points used for reference in providing instructions, places where interference with movement might occur, or places where timing might be a critical factor. The route reconnaissance report or a map study should provide the march planner with information to designate critical points along the route of march and distances from one critical point to another. At designated critical points, guides or signs may be used to ensure the smooth flow of traffic. The convoy commander may want to be present at the passing of some critical points. The start point and release point are two critical points that are always designated. Using the checkpoint symbol, critical points are designated by number, letter, or code word. The march planner must ensure that designations for critical points do not conflict with those of checkpoints.

(2) Start point. SPs provide all units of a march column a common point for starting their movement. When units use more than one route, each route has a start point. The SP is a place along the route of march that is easily recognizable on the map and on the ground such as a road intersection. An SP should be far enough from assembly areas to allow units to organize and move at the prescribed speed and interval when they reach the SP. No element of a march column should be required to march to the rear or through another unit to reach the SP.

(3) Release point. RPs provide all units of the march column a common point at which to reestablish control of their parent unit. The RP should be on the route of march and easily recognizable on the map and on the ground. Units do not stay at the release point. Guides meet units as they arrive at the release point and lead them to the assembly area. Multiple routes and cross-country movement from the release point to assembly areas enable units to disperse rapidly. No unit should be required to countermarch or pass through another unit to reach its new position.

(4) Strip map. Copies of the strip map should be reproduced and distributed to all key personnel. The strip map should contain the start point and release point, restrictions, and critical points and the distances between them.

k. Security.

(1) During the march, units maintain security through observation, weapons orientation, dispersion, and camouflage. Commanders assign sectors of observation to their personnel so that there is a 360-degree observation. Weapons are oriented on specific sectors throughout the column. The lead elements cover the front, following elements cover alternate flanks, and the trail element covers the rear. Security is also maintained during halts.

(a) Scheduled halts are planned along the march route for maintenance and rest or to follow higher level movement orders. At scheduled halts, vehicles and soldiers move to the side of the road while maintaining march dispersion. Local security is set up immediately, and drivers perform operational maintenance checks. However, the unit is ready to move at a moment's notice.

(b) Unscheduled halts and actions may be caused by unforeseen developments such as obstacles, traffic congestion, or equipment failure. If a halt is necessary, the march column's first priority is to establish security. Each unit forms a hasty perimeter defense.

(2) To minimize the ATKHB's vulnerability to enemy air attack, air defense must be planned and air defense security measures implemented. The convoy commander must effectively integrate his air defense artillery assets into his fire plans and ensure that all passive and active air defense measures implemented at company level are planned and used.

(3) Each vehicle in a motor march has an air guard to provide air security. However, specific vehicles may be designated as air guard vehicles to conduct air rather than ground observation.

(4) Obstacles that are reported by an aeroscout platoon should be bypassed if possible. If obstacles cannot be bypassed, the lead march unit goes into a hasty defense to cover and overwatch. If engineers are available to assist, the lead march unit can breach the obstacle. As the lead march unit breaches the obstacle, the other march units move at decreased speed or move off the road and monitor the battalion command net.

(5) If the task force comes under attack by enemy indirect fire during the road march, the unit in contact continues to move. The remainder of the task force attempts to bypass the impact area (Figure F-11).

(6) If the task force is attacked by hostile aircraft during the march, the march unit that is attacked moves off the road into a quick defensive posture and immediately engages the aircraft with all available automatic weapons. The rest of the convoy moves to covered and concealed areas until the engagement stops.

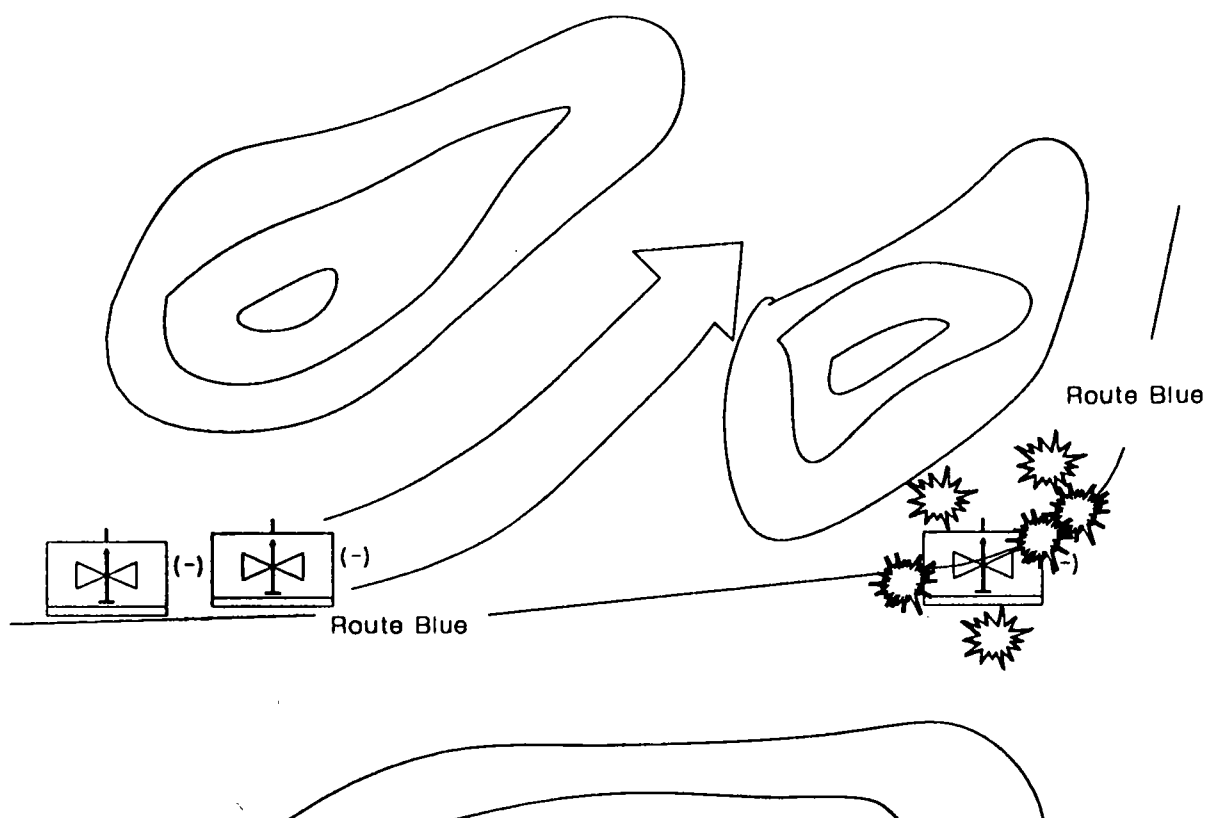


Figure F-11. Actions under indirect fire

(7) Ambushes are fought without delay. If the convoy is ambushed, the march unit in the kill zone increases its speed, fights through, and reports the ambush.

(8) Disabled vehicles must not obstruct traffic; they are moved off the road and their status is reported immediately. Security is established and guides are posted to direct traffic. If the operator repairs the vehicle, he rejoins the rear of the column. If the operator cannot repair the vehicle, trail party maintenance elements recover it.

(9) Messengers and visual signals are the preferred means of communication during road marches. Because the enemy has radio direction-finding equipment, the radio is used only in emergencies and when no other means of communication can be used. Road guides can also be used to pass messages from one march unit to a following march unit. Because of the need for radio silence, road guides are used to control the speed of march units and the intervals between them.

(10) Restrictions are points along the route of march where movement may be hindered or obstructed. These points can include bridges,

intersections, ferries, and bypasses. The march planner should stagger start times, adjust speeds to allow for restrictions, or plan to halt the column en route until the restriction is passed.

(11) Units must be able to operate under limited visibility conditions caused by darkness, smoke, dust, fog, heavy rain, or heavy snow. Limited visibility decreases the speed of movement and increases difficulties in navigation, recognizing checkpoints, and maintaining proper interval between units. To overcome command and control problems caused by limited visibility, convoy commanders may position themselves just behind lead elements. More restrictive control measures, such as additional checkpoints, phase lines, and use of a single route, may become necessary.

(12) The convoy commander also plans for an NBC attack. Some measures he takes are given below.

(a) Ensures that protective and decontamination materials are properly distributed and their location known to the entire march unit.

(b) Ensures that the proper MOPP level is maintained, based on the threat and the temperature level. Personnel may start out in MOPP3 to avoid having to stop to change into MOPP3 or MOPP4.

(c) Chemically or biologically contaminated areas are avoided if possible. If contaminated areas must be crossed, personnel--

- Use MOPP4.
- Cover as much equipment as possible.
- Avoid moving through underbrush.
- Stay on hard-surfaced roads.
- Avoid low areas.
- Avoid moving early or late in the day.
- Stagger vehicles in the column.
- Decrease speed to reduce dust or mud.
- Increase vehicle interval.
- Scrape the surfaces of dirt roads to clear them of contamination.

(d) Avoids nuclear contaminated areas, if possible. If nuclear contaminated areas must be crossed--

- Wear regular wet-weather gear with a scarf or handkerchief over the nose and mouth.

- Avoid stirring up dust as much as possible.
- Ensure that the IM174 radiac meter is used.
- Wash hard-top roads before traveling over them.
- Wet dirt roads to minimize fallout dust.

F-9. TRAINING

There are no special training requirements for unit movement personnel; however, some specialized courses are available. The Joint Military Packaging Center, Aberdeen Proving Grounds, Maryland, trains soldiers to prepare hazardous cargo for transport. Although not a training requirement, individuals who certify that hazardous cargo is properly prepared for shipment must be designated on orders to sign DD Form 1387-2. In addition, the US Air Force conducts the MAC airload planner courses, which trains unit movement officers to plan movements using Air Force assets. Other movement training listed in AR 351-1.

Appendix G

RISK MANAGEMENT

Tough, realistic training conducted to standard is the cornerstone of Army warfighting skills. An intense training environment stresses both soldiers and equipment, creating a high potential for accidents. The potential for accidents increases as training realism increases. Thus realistic training poses a serious drain on warfighting assets. Commanders must find ways to protect their soldiers and equipment from accidents during realistic training to prepare for war. An accidental loss in war is no different in its effects from a combat loss; the asset is gone. Commanders must compensate for the numerical advantages of the Threat by protecting their combat resources from accidental loss. How well they do this could be the decisive factor in winning or losing. Commanders and staffs can use this appendix as a guide for managing risk as it applies to their organization and mission.

G-1. CONCEPT

Risk management is a tool leaders can use to make smart risk decisions in tactical operations. It allows leaders to execute more realistic training scenarios not otherwise possible because of the high probability of accidents. Risk management is a commonsense way of accomplishing the mission with the least risk possible. It is a method of getting the job done by identifying the areas that present the highest risk and taking action to eliminate, reduce, or control the risk. Risk management thereby becomes a fully integrated part of mission planning and execution.

G-2. RESPONSIBILITIES

Risk management is not complex, technical, or difficult. It is a comparatively simple decision-making process--a way of thinking through a mission to balance mission demands against risks. Once understood, risk management is a way to put more realism into training without paying a price in deaths, injuries, or damaged equipment or all three. Risk management is not limited to training scenarios. It is performed during actual combat as well as in peacetime. Leaders must learn to assess risks during training events and apply the same techniques during combat actions. During combat, risks may be taken but only after they are evaluated and weighed as they are during training.

a. Commanders. As in all other areas, commanders are responsible for the effective management of risk. To meet this responsibility, commanders--

- (1) Seek optimum, not just adequate, performance.
- (2) Select from risk reduction options provided by the staff.
- (3) Accept or reject residual risk based on the benefit to be derived.

(4) Train and motivate leaders at all levels to effectively use risk management concepts.

b. Staff. The staff--

(1) Assists the commander in assessing risks and in developing risk reduction options.

(2) Integrates risk controls in plans and orders.

(3) Eliminates unnecessary safety restrictions that diminish training effectiveness.

c. Troop Leaders. Troop leaders--

(1) Develop a total commitment to mission accomplishment and the welfare of subordinates.

(2) Consistently apply effective risk management concepts and methods to operations they lead.

(3) Report risk issues beyond their control or authority to their superiors for resolution.

G-3. PROCESS

a. Step 1: Identify Risks. Identify major events of the operational sequence and list them chronologically; then, if necessary, display them in a flow chart. This process will aid in the detection of specific risks associated with all specified and implied tasks. Safety can be built into an operation by first seeing the operation in its entirety. Operations invariably can be broken down into a series of phases, each with special characteristics and considerations. As soon as the commander states the mission and concept, it is usually possible to define the key events. Operations also have a time factor--a beginning-to-ending series of events in which the timing of events is often as significant as the events themselves. The operations analysis is a useful tool in quickly defining the flow and time sequencing of events in an operation. The objective is to reflect the total operation from the preparatory actions until the operation is completed or the next phase of operations is under way. The operations analysis is a simple but highly effective tool. It ensures that risk is evaluated in every aspect of the operation. Operations safety techniques are effective to a point, but they do not detect risk with the reliability required to achieve the degree of safety needed in today's Army.

b. Step 2: Assess Risks. Determine the magnitude of risks by estimating loss cost and probability. Assess each event, determine whether it is routine, and make an initial risk assessment. Ensure that standards for routine events are adequate to provide an acceptable level of risk.

(1) Consider the value of a risk matrix or decision guide for all or part of the operation. Risk matrices provide a quick and ready method of

breaking down an operation into its major operational aspects and eliminating or controlling the risks associated with it. Like other risk assessment tools, risk matrices can be used alone or with other risk analysis techniques to provide a quick overview of the risk situation. Risk matrices are simple enough to be routinely used by tactical leaders in operational planning. These matrices are nearly always more effective than intuitive methods in identifying the extent of risk. Figure G-1 illustrates a typical matrix that can be used to estimate the level of risk associated with an operation. When using risk matrices, the risk assessor should--

(a) Review each situation to ensure that all significant areas of concern are evaluated, even if they are not included in the matrices.

(b) Use the matrices to analyze the risk to target areas of concern for risk-reducing action.

(c) Review the individual areas of concern before recommending an option. (If an area of concern is off the scale in a particular situation, a higher decision level may be required than the risk gauge suggests.)

(d) Keep in mind that Figure G-1 represents arbitrary weighted factors; modify these factors to fit particular missions and units.

(2) Consider using the METT-T format as another means to assess risks. Leaders can subjectively determine the likelihood and extent of accidental loss based on this type of analysis. When using the METT-T format, the risk assessor should--

(a) Determine mission complexity and difficulty.

(b) Assess the enemy situation and identify specific hazards.

(c) Consider all aspects of the terrain as well as weather and visibility.

(d) Determine the supervision required and evaluate the experience, training, morale, and endurance of troops; also determine the availability of equipment.

(e) Determine the time available for planning and executing the mission.

Side A

Planning

CIRCLE ONE		Risk Value		SCORE _____
Guidance	Preparatory Time			
	Optimum	Adequate	Minimal	
FRAGO	3	4	5	
OPOD	2	3	4	
OPLAN/LOI	1	2	3	

Mission Control

CIRCLE ONE		Risk Value		SCORE _____
Task Organization	Training Event			
	Support Nontactical/ Garrison	Day Tactical	Night Tactical	
OPCON	3	4	5	
Attached	2	3	4	
Assigned	1	2	3	

Crew Endurance

CIRCLE ONE		Risk Value		SCORE _____
Environmental Preparation	Crew Preparation			
	Optimum	Adequate	Minimal	
Tactical	3	4	5	
Training	2	3	4	
Garrison	1	2	3	

Crew Selection

CIRCLE ONE		Risk Value		SCORE _____
Task	Experience Level			
	Highly Qualified	RL 1	RL 3	
Complex	3	4	5	
Routine	2	3	4	
Simple	1	2	3	

Side A Subtotal _____

Figure G-1. Suggested format for a risk assessment work sheet

Side B

Weather

CIRCLE ONE		Risk Value		SCORE _____
Wind Velocity	Ceiling/Visibility			
	>1000/3	< 1000/3	Minimums	
> 30 kt	3	4	5	
16-30 kt	2	3	5	
0-15 kt	1	2	5	

Terrain

CIRCLE ONE		Risk Value		SCORE _____
Type of Terrain	Modes of Flight			
	Low Level	Contour	NOE	
Mountain	3	4	5	
Desert/Jungle	2	3	4	
Hills, Flat/Rolling	1	2	3	

Equipment

CIRCLE ONE		Risk Value		SCORE _____
Equipment Age	Aircraft Status			
	FMC	PMC	Mission Equipped	
Old	4	5	5	
Average	2	4	4	
New	1	2	2	

Subtotal Side A _____

Subtotal Side B _____

Total _____

0 to 12 Low Risk	13 to 23 Caution	24 to 35 High Risk*
---------------------	---------------------	------------------------

*High-risk operations assigned a value of 24-35 require coordination, before executing the mission, with the next higher level of command external to the organization making the assessment. When two or more areas are assigned a risk factor of 5, the overall rating is high risk.

Figure G-2. Suggested format for a risk assessment work sheet (continued)

c. Step 3: Make Decisions and Develop Controls. Make risk acceptance decisions by balancing risk benefits against risk assessments. Eliminate unnecessary risks. Reduce the magnitude of mission-essential risks by applying controls. Controls range from hazard awareness to detailed operational procedures. Focus on high-hazard events and events not covered by a good set of standards. Complete a preliminary hazard analysis of these events. The preliminary hazard analysis is the initial examination of the hazards of an operation and their implications. It is normally based on the mission analysis and data-base review and takes place before the details of an operation have been completely defined. The objective of the preliminary hazard analysis is to define, at the earliest possible point in the operational life cycle, the hazards that can be expected. Doing this early means that these hazards can be addressed when they are still preliminary; that is, when the operation is still being planned.

(1) Based on the preliminary risk analysis and products of analytical aids, develop a roster of options for eliminating or controlling the risks. Select or offer options for command decision. Once risks are identified and measured as accurately as possible, the leader must act to eliminate or control them. These controls must not unnecessarily interfere with training objectives. The best options often come from reviewing the doctrinal publications relevant to the operation to glean information about the proper procedures for hazard control. Merely reviewing the analysis and assessment will often suggest options. Some options will be more effective than others. AR 385-10 provides a convenient list of actions that commanders can use as an aid in ranking options. In order of priority, commanders should--

(a) Eliminate the hazard totally, if possible. Engineer out the hazard or design equipment to eliminate the hazard or incorporate fail-safe devices.

(b) Guard or control the hazard. Use automatic monitoring or alarming devices. Provide containment or barriers.

(c) Change operational procedures to limit exposure. Modify operational procedures to minimize exposure (numbers and duration) consistent with mission needs.

(d) Train and educate personnel in hazard recognition and avoidance.

(e) Provide protective clothing or equipment that will minimize injury and damage potential.

(f) Use color coding and signs to alert personnel to hazards. Motivate personnel to use hazard avoidance actions.

(2) Leaders can detect and eliminate unnecessary safety restrictions that impede the realism or effectiveness of training. With proper controls, these restrictions can be eliminated or scaled back. Check for residual effects before implementing risk reduction options. Visualize what will

happen once the option has been implemented. Sometimes reducing one risk will only introduce others.

d. Step 4: Implement Controls. Integrate specific controls into plans, OPORDs, SOPs, training performance standards, and rehearsals. Knowledge of risk controls, down to the individual soldier, is essential for the successful implementation and execution of these controls.

e. Step 5: Supervise. Determine the effectiveness of standards in controlling risk. The commander must enforce controls and standards. This is key to loss control. The commander may have approved a number of risk reduction procedures, but approval does not mean that the procedures are carried out. Leaders must monitor the situation to ensure that action is actually taken. The prudent leader then follows up to see that the doers understand and accept the guidance. Leaders should also monitor the effect of risk reduction procedures to verify that they really are good ideas. This is especially true for new and untested procedures.

(1) Leaders must always monitor the operational activities of subordinate elements. Only by seeing the character of operations can leaders fully appreciate risk implications. When monitoring operational activities, leaders should--

(a) Avoid administrative intrusions and not get in the way.

(b) Go where the risks are and spend time at the heart of the action.

(c) Analyze and think through issues, not just watch.

(d) Work with key personnel to improve operational procedures after the action and not hesitate to address imminent danger issues on the spot.

(e) Fix systemic problems that are hindering field effectiveness.

(2) Leaders must be able to balance the cost of the risk involved with the value of the outcome desired in an operation. They must consider and manage risk in making decisions. Three general rules apply when leaders select a tactical procedure. They are--

(a) No unnecessary risk should ever be accepted. The leader who has the authority to accept or reject a risk is responsible for protecting his soldiers from unnecessary risk. If a risk can be eliminated or reduced and the mission still be accomplished, the risk is unnecessary and must not be accepted.

(b) Risk decisions must be made at the appropriate level. The leader who will answer for an accident is the person who should make the decision to accept or reject the risk. In some cases, this will be a senior officer. In other cases, it will be the first-line leader. Small-unit

commanders and first-line leaders are going to make risk decisions in combat. Therefore, they should learn to make risk decisions in training.

(c) The benefits of taking a risk must outweigh the possible cost of the risk. Leaders must understand the risk involved and have a clear picture of the benefits to be gained from taking the calculated risk.

Appendix H

COMMAND POST ANNEX TO A TACTICAL SOP

This appendix is a sample of a command post annex to a tactical SOP. It includes information on command and control, organization and operations, equipment and supplies, journals and logs, and mission and planning orders. It also includes information on mission briefings and debriefings, liaison, and precombat checks.

ANNEX A TO A TACTICAL SOP COMMAND AND CONTROL

H-1. PURPOSE

This annex prescribes the organization and operation of the headquarters command and control elements.

H-2. GENERAL

- a. Combat and combat support operations are planned, coordinated, supervised, and controlled by the main command post tactical CP.
- b. Combat service support operations are planned, coordinated, supervised, and controlled by the combat trains CP and the field trains CP.

H-3. COMMAND ORGANIZATION

- a. Battalion XO. The battalion XO exercises overall responsibility for the main CP.
- b. Battalion S3. The battalion S3 exercises control of operations. He also exercises staff supervision of the main CP and directs activities in the absence of the commander and the XO.
- c. Main CP. Personnel at the main CP inform subordinate elements of the battalion commander's location.
- d. Subordinate Units. Personnel at subordinate units report any changes in the chain of command to the main CP.
- e. Command Post in Control. The command post in control is determined by the physical location of the commander and the operational phase of the mission.
- f. Command Facility in Control. Figures H-1 shows the command and control structure of the command facility.

ANNEX A TO A TACTICAL SOP
COMMAND AND CONTROL

- | | |
|---------------------|--|
| 1. Tactical CP | 1. Deployed/operational; main CP not operational |
| 2. Main CP | 2. Tactical CP not operational |
| 3. Combat trains CP | 3. Tactical and main CPs not operational |
| 4. Field trains CP | 4. Tactical CP/main CP/field trains CP |

Figure H-1. Command facility in control

H-4. BATTALION COMMAND POST ORGANIZATION

a. Main Command Post. The main command post tracks, analyzes, controls the current battle, and plans future operations. It monitors the status of combat power at all times.

(1) Organization of the main CP.

- (a) S2.
- (b) S3 (located at the tactical CP when it is deployed).
- (c) Assistant S3.
- (d) FSE (-).
- (e) Chemical officer/NCO.
- (f) CE (-).
- (g) Flight operations specialist.
- (h) Operations NCO/assistant operations NCO.
- (i) Liaison officer (when not performing LO duties.)
- (j) Representatives from administrative, logistics, and HHC headquarters as required.

(2) Communications nets.

- (a) Aviation brigade command FM net.
- (b) Battalion command FM net.
- (c) Aviation brigade O&I net.
- (d) Supported unit command FM net.

ANNEX A TO A TACTICAL SOP
COMMAND AND CONTROL

(e) Quick Fire net (FS).

(f) Battalion A&L net.

(3) Movement.

(a) The battalion S3 will select the general location of the main CP. The CE element will provide line-of-sight survey information to the S3 for proposed and alternate sites.

(b) The HHC commander, along with the battalion S3, plans for and moves the battalion main CP.

b. Tactical Command Post. The tactical CP is located forward in the area of operations to facilitate continuous command and control of current operations. It is established for short durations and operates from airmobile and ground mobile assets. It also maintains command and control when the main CP displaces. The tactical CP closes with the assembly area upon completion of the current operation.

(1) Personnel and elements located in the tactical CP.

(a) Commander.

(b) S3.

(c) Intelligence analyst.

(d) FSE.

(e) TACP.

(2) Communications nets.

(a) Aviation brigade command FM net.

(b) Supported unit command FM net.

(c) Battalion command FM net.

(d) Battalion A&L net as required.

(e) JAAT net as required.

ANNEX A TO A TACTICAL SOP
COMMAND AND CONTROL

(3) Movement.

(a) To assist in battle synchronization, the tactical CP will operate independently or will be collocated with the tactical CP or main CP of the higher headquarters.

(b) Equipment for the tactical CP will be based on that which is required for the current mission. The standard equipment configuration for a tactical CP is as follows:

- Utility helicopters (UH-60).
- M-100/CUCV-series vehicles (secure FM).
- Current situational orders and overlays to facilitate command and control.

(c) A retransmission capability will be established for the tactical CP, main CP, or both facilities as dictated.

c. Combat Trains CP.

(1) The combat trains CP conducts activities associated with tracking, analyzing, and controlling some combat support and all combat service support for the battalion. Planning for future combat service support operations is conducted based on detailed status reports on equipment, logistics, and personnel.

(2) Personnel located in the combat trains CP:

- (a) S1/S4.
- (b) Battalion personnel and administration center.
- (c) Representatives from the ground and air maintenance sections.
- (d) CE (-).

(3) Communications nets.

- (a) Battalion A&L net.
- (b) Battalion command net.

ANNEX A TO A TACTICAL SOP
COMMAND AND CONTROL

H-5. COMMAND POST ADMINISTRATIVE PROCEDURES

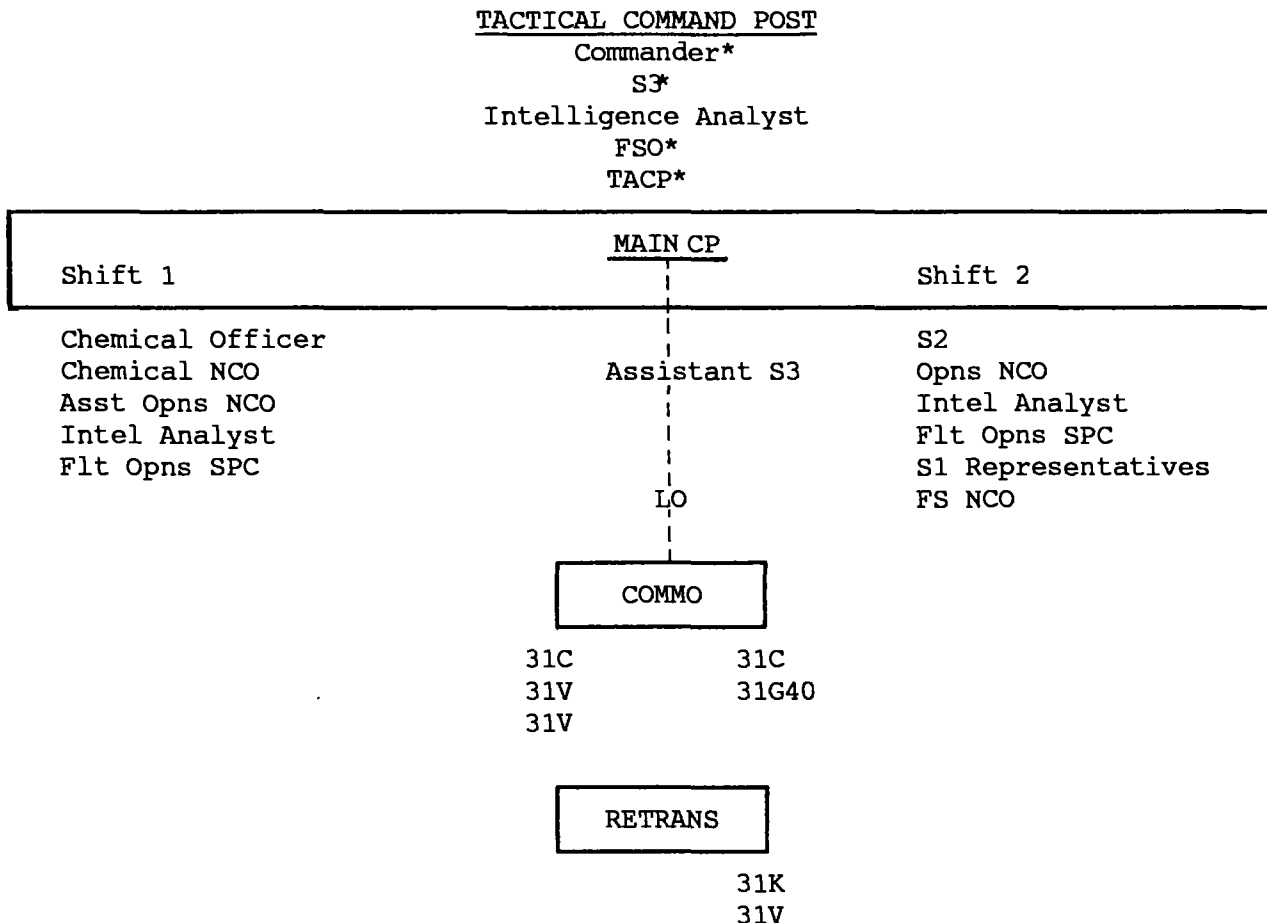
a. Police Standards. Personnel will not sleep or eat in command posts. All personnel are responsible for main CP police and work-area maintenance.

b. Uniform. Per Annex A (Command and Control), Appendix 4, Tab A, assigned personnel and any other personnel conducting business in command posts will remove and stow their load-bearing equipment in the designated equipment storage area. Protective masks and MOPP gear will be worn or readily available according to the current MOPP status. Pistols/revolvers will be worn; individually assigned weapons will be stowed and secured.

APPENDIX 1 TO ANNEX A TO A TACTICAL SOP
MAIN CP ORGANIZATION AND OPERATIONS

H-6. PURPOSE

This appendix outlines responsibilities and operational functions of the main command post. Figure H-2 shows the organization of a tactical command post.



*Denotes member of command group for tactical operations.

Figure H-2. Organization of the main CP

H-7. GENERAL

a. The S3 has staff responsibility for establishing procedures for the internal arrangement and security of the main CP.

APPENDIX 1 TO ANNEX A TO A TACTICAL SOP
MAIN CP ORGANIZATION AND OPERATIONS

b. The main CP will operate on a 24-hour basis.

c. Staff sections will maintain a daily journal or log to record actions and communications traffic (Tab E).

d. Operational maps and interchangeable overlays will be standardized and posted in the main CP to display a visual portrayal of current and future operations. These maps and overlays will include the following:

- (1) Current situational map.
- (2) Future operations map.
- (3) Intelligence (current and future to include IPB).
- (4) Fire support.
- (5) Assembly area diagram and defense plan.

H-8. ORGANIZATION AND FUNCTIONS

a. Assistant S3. Responsibilities of the assistant S3 include the following:

- (1) Assist the S3 in the performance of his duties, and supervise the main CP on an alternate shift.
- (2) Maintain the current operations estimate in coordination with the S2.
- (3) Maintain a current operations map.
- (4) Prepare operations orders, plans, and movement orders for current and future tactical operations as directed by the S3.
- (5) Supervise the preparation of records and reports.
- (6) Supervise the main CP (in coordination with the operations NCO) in the absence of the S3.
- (7) Integrate indirect fires with the FSE.

b. Chemical Officer/NBC Element. Responsibilities of the chemical officer/NBC element include the following:

- (1) Assist the S3 in the performance of his duties, and supervise the main CP in an alternate shift.

APPENDIX 1 TO ANNEX A TO A TACTICAL SOP
MAIN CP ORGANIZATION AND OPERATIONS

- (2) Advise the commander and S3 on NBC operations.
- (3) Plan and coordinate requirements for NBC operations.
- (4) Prepare the NBC elements included in plans and orders.
- (5) Prepare and evaluate the NBC situation overlay.
- (6) Maintain data on radiation exposure of subordinate units.
- (7) Coordinate with the S2.
- (8) Evaluate NBC reports and strike messages.
- (9) Advise the commander on MOPP levels.

c. S2. Responsibilities of the S2 include the following:

(1) Assist the S3 in the performance of his duties, and supervise the main CP in an alternate shift.

(2) Direct the production and dissemination of combat intelligence to the commander, S3, and subordinate units.

(3) Coordinate the production of intelligence information through scouts and ground patrols.

(4) Maintain the intelligence situation map.

(5) Direct the processing of PWs, civilian internees, and detainees in coordination with the S1.

(6) Direct the evacuation of captured documents and materials.

(7) Assess and brief likely enemy actions.

(8) Prepare the intelligence elements included in plans and orders.

(9) Maintain main CP security, and advise the S3 on operational security.

d. Intelligence NCO. Responsibilities of the intelligence NCO include the following:

(1) Assist the S2 in the performance of his duties.

(2) Act for the S2 in the absence of the S2 during alternate shifts.

APPENDIX 1 TO ANNEX A TO A TACTICAL SOP
MAIN CP ORGANIZATION AND OPERATIONS

(3) Provide input to intelligence elements for inclusion in all plans and orders.

(4) Supervise the production of enemy situation maps and overlays.

(5) Maintain a log of reports that are submitted and received.

(6) Prepare intelligence summaries for briefing.

e. Fire Support Element. Responsibilities of personnel in the fire support element include the following:

(1) Assist the S3 in the performance of his duties and supervise the main CP on an alternate shift.

(2) Advise the commander and S3 on all fire support delivery and acquisition functions.

(3) Determine requirements for fire support means and make recommendations concerning the use of fire support.

(4) Inform the S3 on the availability of fire support.

(5) Coordinate with the brigade FSO on the integration of air operations and fire support plans.

f. Flight Operations Specialist. Responsibilities of the flight operations specialist include the following:

(1) Record and maintain flight plans on a flight log in the main CP before missions start and as changes occur.

(2) Acquire and continuously update weather data as it is provided by the S2.

g. Operations NCO. Responsibilities of the operations NCO include the following:

(1) Assist the S3 in the performance of his duties, and supervise the main CP.

(2) Update the enemy/friendly situation map.

(3) Prepare and conduct briefings as required.

(4) Establish and prepare records and reports.

(5) Prepare SITREPs.

APPENDIX 1 TO ANNEX A TO A TACTICAL SOP
MAIN CP ORGANIZATION AND OPERATIONS

- (6) Update charts, reports, logs, and status boards as required.
- (7) Monitor operations of subordinate units.
- (8) Supervise the establishment and displacement of the main CP.
- (9) Inspect main CP personnel for proper uniform and equipment.
- (10) Assist in main CP security planning.
- (11) Maintain the status of weapons, communications, and sensitive items in the main CP area.
- (12) Conduct reconnaissance for alternate main CP site.
- (13) Establish a distribution and message center.

h. Communications/Electronics NCO. Responsibilities of the communications/electronics NCO include the following:

- (1) Coordinate with the S3 to locate sites that afford continuous communications capability.
- (2) Plan for and supervise all wiring/remoting at the main CP site and assembly area.
- (3) Plan for the MSE net.

H-9. SHIFTS AND DUTIES

Continuous operation of the main CP will be accomplished with the establishment of two shifts (Figure H-2). Shifts will be 12 hours long with a minimum of 30 minutes overlap to ensure an effective transition. Transition briefings will be held 30 minutes before shift change.

- a. Shifts. Shift 1 is from 0800 to 2000; shift 2 is from 2000 to 0800.
- b. Officer-in-Charge/Noncommissioned Officer-in-Charge. The OIC and NCOIC of the main CP will be the ranking officer and NCO on duty.
- c. Shift Duties.

- (1) Maintain communications (remotes, switchboard, generators, and land line).
- (2) Submit reports to higher headquarters (per tactical SOP).
- (3) Maintain situation maps/overlays (enemy, friendly, and NBC).

APPENDIX 1 TO ANNEX A TO A TACTICAL SOP
MAIN CP ORGANIZATION AND OPERATIONS

(4) Maintain records, logs, reports (flight log, communications, NBC, orders, and plans).

(5) Maintain status charts (aircraft, weather, sensitive items, and communications logistics).

(6) Maintain material (fuel, generators, water, supplies, rations, and forms/publications).

(7) Continually maintain sensitive items (report on shift change).

d. Rear CP. Figure H-3 shows the responsibilities of the A and B teams for the S1 and S4 elements in the rear CP.

<u>S4 Element</u>	<u>A Team</u>	<u>B Team</u>
RTO	S4 Clerk 1	S4 Clerk 2
Yellow Reports	S4 NCOIC	S4 SGT
Document Register	S4 NCOIC	S4 SGT
Requisitions	S4 NCOIC	S4 SGT
(I, II, III, IV, V, VII, VIII)		
Adjustments Documents	S4 NCOIC	S4 SGT
Logistics Planning	S4 OIC	
Air Resupply	S4 OIC	
<u>S1 Element</u>	<u>A Team</u>	<u>B Team</u>
Red Reports	S1 NCOIC	Admin NCO
Mail/Legal Actions	Legal SPC	
Personnel	PSNCO	
Finance	PSNCO	Admin SPC

Figure H-3. Responsibilities of the S1 and S4 elements in the rear CP

APPENDIX 1 TO ANNEX A TO A TACTICAL SOP
MAIN CP ORGANIZATION AND OPERATIONS

<u>S1 Element</u>	<u>A Team</u>	<u>B Team</u>
SIDPERS	SIDPERS SPC	
OER/EER/Awards		Admin NCO
Field Meal Cards		Admin NCO
Personnel Planning	S1 OIC	
<u>Supply/Arms</u>		
Supply Pickups	Supply SPC	
Hand Receipts	Supply SGT	
In-processing	Supply SPC 2	
Laundry	Supply SPC 2	
Expendable Issue	Supply SPC 1	
SSSC	Supply SPC 1	
Wpns Maint/Repair	Armorer/Asst Armorer	

Figure H-3. Responsibilities of the S1 and S4 element in the rear CP
(continued)

e. Rear CP Shift Maintenance. Figure H-4 shows the shift maintenance teams in the rear CP.

APPENDIX 1 TO ANNEX A TO A TACTICAL SOP
MAIN CP ORGANIZATION AND OPERATIONS

A Team	B Team
S4 OIC	S4 SGT
S4 NCOIC	S4 Clerk
S4 Clerk #1 (RTO) S1	#2 RTO
S1 OIC	Admin NCO
S1 OIC (S4)	Admin SPC
PSNCO	Asst Armorer
Legal SPC	
SIDPERS SPC	
Supply SGT	
Supply SPC 1	
Supply SPC 2	
Armorer	

Figure H-4. Shift maintenance teams in the rear CP

H-10. ESTABLISHMENT OF THE MAIN CP

a. The operations NCO is responsible for setting up and dismantling the main CP site. He will retain control of enlisted personnel within the main CP staff sections until the priority of tasks is completed.

b. The priority of tasks for establishing main CP sites includes the following:

- (1) Establish local security and prepare range cards.
- (2) Establish and maintain radio communications.
- (3) Set up main CP and designate dismount point.
- (4) Camouflage the main CP.
- (5) Improve radio communications.
- (6) Lay wire/remotes.
- (7) Ensure that generators are operational.
- (8) Reconnoiter/select alternate main CP site.
- (9) Establish helipad (tactical Y).

APPENDIX 1 TO ANNEX A TO A TACTICAL SOP
MAIN CP ORGANIZATION AND OPERATIONS

- (10) Establish work shifts.
- (11) Maintain equipment properly.
- (12) Improve defensive positions.
- (13) Establish living quarters.
- (14) Establish facilities for personal hygiene.

H-11. SECURITY OF THE MAIN CP

(See Annex C [Operational], Appendix 2, Tab D.)

- a. The S3 is responsible for main CP security.
- b. Areas of responsibility will be designated using the clock method.
- c. A defense plan will be prepared and submitted to the XO for formulation of a consolidated defense plan.
- d. Primary and alternate fighting positions will be prepared.
- e. Main CP guards will be designated for 24-hour operations.
- f. Concertina wire will be placed around the main CP to control entry.

H-12. MAIN HELIPAD

Selecting and marking the main helipad is the operations NCO's responsibility. Optimum distance from the main helipad to the main CP is 1 kilometer. The helipad must accommodate both day and night operations. Annex D contains more information on night operations.

TAB D, APPENDIX I, ANNEX A (COMMAND AND CONTROL)
EQUIPMENT AND SUPPLIES

H-13. EQUIPMENT

Designated vehicles with prepared load plans will transport the following equipment for the main CP:

- a. Main CP. (Quantities are not indicated.)
 - (1) Tents, ARFAB complete with frames.
 - (2) Flight operations field desk.
 - (3) S3 field desk.
 - (4) FSE field desk.
 - (5) Field tables.
 - (6) Screen (camouflage with supports and spreaders).
 - (7) Light sets (general illumination).
 - (8) Water cans.
 - (9) Plexiglass-covered operations map (4' x 8') or equivalent (main CP divider).
 - (10) Current operations overlays.
 - (11) Intelligence and FSE map boards.
 - (12) Cots.
 - (13) Sleeping tents with screens (camouflage).
 - (14) Heating stoves.
 - (15) Communications table.
 - (16) Folding chairs.
 - (17) Extension cords.
 - (18) Lighting, aviation bean bag, (Y setup).
 - (19) Easel with pointers.
 - (20) Power supply (generators).

TAB D, APPENDIX I, ANNEX A (COMMAND AND CONTROL)
EQUIPMENT AND SUPPLIES

- (21) Fuel cans.
- (22) Footlocker (supplies, forms, and publications).
- (23) Weapon rack.
- (24) Antenna group OE-254.
- (25) Communication equipment.
 - (a) AN/VRC-24, -46, -47 with speech security equipment (TSEC/KY-57).
 - (b) Telephone set (TA-838).
 - (c) AN/GRC-106.
- (26) Radiacmeter (IM93).
- (27) Night vision goggles (AN/PVS-5).
- (28) Electric transfer keying device (KYK-13).
- (29) Cryptographic speech equipment (KY-65).
- (30) Alarm chemical agent (M8A1).
- b. Tactical CP. (Quantities are not indicated.)
 - (1) Power supply.
 - (2) OE-254 antenna.
 - (3) Map board.
 - (4) Water cans (full).
 - (5) Fuel cans.
 - (6) MRE.
 - (7) Brigade/division tactical SOP.
 - (8) Supply locker (toilet paper, grease pencils, engineer tape, shop towels, flashlights, batteries, alcohol, pens, and acetate).
 - (9) Communication equipment.

TAB D, APPENDIX 1, ANNEX A (COMMAND AND CONTROL)
EQUIPMENT AND SUPPLIES

H-14. SUPPLIES AND PUBLICATIONS

Amounts of each item will be determined based on the length of the exercise.

a. Supplies.

- (1) Acetate (regular or combat).
- (2) Alcohol.
- (3) Batteries (BA-30/BA-200).
- (4) Binders.
- (5) Chemical lights.
- (6) Clips.
- (7) Classified document covers.
- (8) Document protectors.
- (9) Engineer tape.
- (10) Flashlight.
- (11) Highlighter markers.
- (12) Index cards.
- (13) Marker pens-Lumecolor (assorted).
- (14) Manila folders.
- (15) Paper/shop towels.
- (16) Paper.
 - (a) Legal pads.
 - (b) Writing pads.
 - (c) Butcher.
 - (d) Carbon.
 - (e) Bond.

TAB D, APPENDIX 1, ANNEX A (COMMAND AND CONTROL)
EQUIPMENT AND SUPPLIES

- (17) Pens/pencils.
- (18) Punch (2- and 3-hole).
- (19) Rulers.
- (20) Scissors.
- (21) Stapler.
- (22) Tape (assorted).
- (23) Tacks (thumb).
- (24) Trash bags.
- (25) Trash can.
- (26) Toilet paper.

b. Publications and Forms.

- (1) Blank copies of the standard OPORD format.
- (2) DA Form 1594.
- (3) Reports (Annex V).
- (4) Aviation brigade tactical SOP.
- (5) Division tactical SOP.
- (6) SOI.
- (7) FM 1-111.
- (8) FM 1-112.
- (9) FM 101-5.
- (10) FM 1-140.
- (11) FM 1-104.
- (12) FM 1-102.
- (13) FM 6-20.

TAB D, APPENDIX 1, ANNEX A (COMMAND AND CONTROL)
EQUIPMENT AND SUPPLIES

(14) FM 17-50-1.

(15) FM 100-5.

(16) FM 101-5-1.

NOTE: The actual mission will dictate what publications are required.

TAB E, APPENDIX 1, ANNEX A (COMMAND AND CONTROL)
JOURNAL/LOGS/CHARTS

H-15. JOURNALS/LOGS/CHARTS

Every primary staff section must maintain a journal. The journal is maintained using the daily staff journal or duty officer's log and an associated journal file. During combat operations, a continuous journal is maintained.

H-16. DA FORM 4004

The individual, tear-out pages of the Message Form Book provide a standard, organized method to transcribe incoming or outgoing radio messages, land line messages, and other information into a permanent record. Each entry on a message form results in three copies being made.

a. General instructions for use of the Message Form Book are found on the front cover of the book. Every radio operator must be familiar with its use.

b. Disposition instructions for DA Form 4004 are as follows:

(1) Original is forwarded to the appropriate individual/staff section.

(2) One copy is attached to/filed with the appropriate journal/log.

(3) One copy is retained in the Message Form Book.

H-17. DA FORM 1594

a. Daily Staff Journal. The daily staff journal or duty officer log is a chronological record of events that occurs in a staff section/company in a 24-hour period from 0001 to 2400 (local). The record provides the next shift/commander a permanent record of what occurred during the previous shift so he can continue to control operations. Therefore, it must be clear, concise, and accurate.

b. Journal File.

(1) The journal file is a folder containing all the material used to support entries made in the journal. Copies of orders, periodic reports, messages, memorandums, maps, overlays, and other pertinent information is included in this file.

(2) The item number assigned to an entry in the journal is placed on the corresponding supporting material; the supporting material is filed in the folder in chronological order.

TAB E, APPENDIX 1, ANNEX A (COMMAND AND CONTROL)
JOURNAL/LOGS/CHARTS

(3) The journal file is part of the journal and is opened and closed with the journal. Journals and journal files are permanent records. Once the journal is closed out, it and all of the supporting documents must be filed in the appropriate staff section's files under MARKS file number 220-15a according to AR 25-400-2.

(4) Figure H-5 shows a sample DA Form 1594. Instructions for completing the items indicated by circled numbers are given in AR 220-15 and, when necessary, are supplemented by the instructions below.

(a) Items 1 through 6. Self-explanatory.

(b) Item 7 (Item Number). Each entry made in the journal is numbered consecutively beginning with the numeral "1."

(c) Item 8 (Time). The "time in" column denotes the time an incoming message was received or the time an event was reported. The "time out" column is used to record the time a message was dispatched or the time an event or action was initiated by the staff section or company.

(d) Item 9 (Incidents, Messages, and Orders). This column is a brief synopsis of all essential details of incidents, messages, orders, and so on. When supporting material, such as message books forms, is filed in the journal file, only information that can easily identify the item needs to be included. As a minimum, the date-time group and subject must be entered in the journal/log.

(e) Item 10 (Action Taken). This column is used to indicate the immediate action taken. The following symbols are used for this purpose:

- M - posted on the situation map.
- S - circulated to members of the staff/command group.
- T - information disseminated to subordinate elements.
- F - copy filed in the journal/log file.

(f) Item 11 (Initials). The individual making the entry in the journal/log initials in this item.

(g) Items 12 and 13. Self-explanatory.

TAB E, APPENDIX 1, ANNEX A (COMMAND AND CONTROL)
JOURNAL/LOGS/CHARTS

[illegible]DA FORM 1594
NOV 02

PREVIOUS EDITION OF THIS FORM IS OBSOLETE.

☆ U.S. Government Printing Office: 1984-421-649/17198

Figure H-5. DA Form 1594

TAB E, APPENDIX 1, ANNEX A (COMMAND AND CONTROL)
JOURNAL/LOGS/CHARTS

H-18. LOGISTICS/PERSONNEL STATUS BOARD

Figure H-6 shows an example of a battalion logistics/personnel status board.

BATTALION LOGISTICS / PERSONNEL STATUS						
AS OF:						
AIRCRAFT STATUS						
	AH-64 FMC/PMC	OH-58 FMC/PMC	UH-60 FMC/PMC			
A						
B						
C						
HSC						
AVUM						
FARP STATUS						
NAME	STATUS	GRID	HFM	2.75	30mm	JP4
PERSONNEL						
TOTAL	A	B	C	HSC	AVUM	
OFFICER						
WARRANT						
ENLISTED						

Figure H-6. Example of a battalion logistics/personnel status board

H-19. ENEMY ORDER OF BATTLE

Figure H-7 shows an example of an enemy order of battle chart.

ENEMY ORDER OF BATTLE				
UNIT: _____ SUB UNITS: _____		UNIT: _____ SUB UNITS: _____		
MAJOR EQUIP.	# PER BN	# PER REGT	MAX EFF. RANGE	REMARKS

Figure H-7. Example of an enemy order of battle chart

H-20. WEATHER BOARD

Figure H-8 shows an example of a weather status board.

WEATHER AS OF: _____					
CURRENT: CEILING WIND DA PA ALT TEMP VIS HUMIDITY					
FORECAST VALID THRU _____ CEILING: WIND: MAX DA: MAX PA: VISIBILITY: MAX TEMP: MIN TEMP.:					
LIGHT DATA					
DATE	SS	MR	MS	EENT	%ILLUM

Figure H-8. Example of a weather status board

TAB E, APPENDIX 1, ANNEX A (COMMAND AND CONTROL)
JOURNAL/LOGS/CHARTS

H-21. MISSION PLANNING

a. Mission Assignment. Before the mission is assigned, the following actions will be accomplished.

- (1) Monitor radio nets continuously.
- (2) Receive/interpret SITREPs.
- (3) Update situation maps/overlays.
- (4) Analyze the enemy situation continually.
- (5) Obtain, implement, and control battle status for subordinate units.
- (6) Advise the commander/S3 on all of the action above.

b. Mission Analysis. After the mission is assigned, the following actions will be accomplished.

(1) Activate the one-third/two-thirds rule. Allow subordinate elements two-thirds of the available time to complete mission planning. Establish a time line.

- (a) Specified tasks.
- (b) Implied tasks.
- (c) Essential tasks.

(2) The S3/assistant S3 will issue a warning order. Main CP shift personnel will send warning orders to appropriate subordinate elements and sections.

(3) The commander/S3 will restate the mission and issue planning guidance and intent to the staff.

(4) The executive officer will synchronize all staff coordination and planning. Staff estimates and planning are initiated for the current operation; planning continues for future operations.

- (5) The S3 will establish suspenses for all actions.
- (6) Staff estimates are completed.

APPENDIX 2 TO ANNEX A TO A TACTICAL SOP
MISSION PLANNING AND ORDERS

(7) A consolidated battalion staff estimate is synchronized to address the mission analysis and planning guidance (S3), intelligence preparation of the battlefield (S2), and current status and resources (S1/S4). It will also compare the course of action, give a recommendation, and present a wargame.

(8) The commander's estimate and decision are based on staff input. The commander issues the staff his estimate and concept of the operation, which includes the following elements:

- (a) Task organization.
- (b) Control measures.
- (c) Command relationships.
- (d) Scheme of fires.
- (e) Mission-oriented protective posture.
- (f) Rear operations.
- (g) Contingency plans.
- (h) Liaison/coordination.

(9) The OPORD/FRAGO is completed according to FM 101-5.

- (a) Fragmentary orders will be used during operations.
- (b) Written orders will be used when time permits.
- (c) Maximum use will be made of overlays/charts.

(10) The commander approves the order and annexes to support the concept of the operation.

(11) Subordinate units and staff are informed of the mission briefing time.

(12) S3/assistant S3 are advised on changes in the enemy/friendly situation to include weather update, aircraft status, available assets, and capabilities of the battalion to conduct the mission.

c. Mission Briefing.

(1) Main CP shift personnel will contact all members of the command and staff and ensure that they are present for the mission briefing.

APPENDIX 2 TO ANNEX A TO A TACTICAL SOP
MISSION PLANNING AND ORDERS

(2) The briefing is conducted by the S3, assistant S3, or main CP OIC in the absence of the S3 or assistant S3.

(3) The mission briefing will include the following:

(a) OPORD/FRAGO (FM 101-5).

(b) Appropriate maps and overlays.

(4) The following is a general briefing sequence:

(a) XO - administrative information.

(b) S3 - introduction and current situation to include the commander's intent and task organization.

(c) S2 - (paragraph 1).

(d) S3 - (paragraphs 2, 3, and 5).

(e) Fire support - (fires).

(f) S1 - (paragraph 4).

(g) S4 - (paragraph 4).

(h) Commander - restate intent and make closing remarks.

d. Premission Preparation.

(1) Backbriefs the commander.

(2) Conduct rehearsals at all levels.

(3) Continue planning and coordination.

(a) Establish liaison (if not already established).

(b) Establish forward command and control (tactical CP).

e. During the Mission.

(1) Maintain communications.

(2) Maintain SITREPs (relay to higher headquarters and to the tactical CP).

APPENDIX 2 TO ANNEX A TO A TACTICAL SOP
MISSION PLANNING AND ORDERS

(3) Sustain the operation.

(4) Maintain command, control, and troop battle status.

f. After the Mission.

(1) Monitor and maintain constant communications.

(2) Relay SITREPs to higher headquarters and the tactical CP.

(3) Implement troop battle status.

(4) Obtain aircraft status for all companies.

(5) Analyze the enemy situation continually.

(6) Prepare for future operations.

(7) Conduct the mission debrief. (See Tab B, Appendix 2.)

(a) Mission results.

(b) Enemy location and activity.

(c) Enemy AD location and activity.

(d) Obstacles to surface movement.

(e) Weather.

(f) Map updates.

(g) Communications.

(h) Aircraft and personnel status.

(i) FARP status.

(j) Friendly and supporting units.

(k) Recommendations.

APPENDIX 2 TO ANNEX A TO A TACTICAL SOP
MISSION PLANNING AND ORDERS

H-22. COMMAND AND STAFF BRIEFINGS

Command and staff briefings will be held daily as directed by the commander. Briefings will be controlled by the battalion executive officer or S3 in the battalion XO's absence; the S3 will control the briefing.

a. General Briefing Sequence.

- (1) S1.
- (2) S2.
- (3) S3.
- (4) S4.
- (5) Chemical.
- (6) Communications.
- (7) AMO.
- (8) BMO.
- (9) Safety.
- (10) CSM.
- (11) XO.
- (12) Commander.

b. Briefing Materials. Each staff section is responsible for maintaining briefing materials and current status at all times.

H-23. MISSION GRAPHICS

Figure H-9 shows the codes for each control measure on the battlefield.

APPENDIX 2 TO ANNEX A TO A TACTICAL SOP
MISSION PLANNING AND ORDERS

CONTROL MEASURE	CODE
Forward assembly areas Names	Baseball Team
Holding Areas	Female Names
FARPs	Trees
Passage Points/Contact Points/Checkpoints	1-9, 80-99
Phase Lines	Male Names
ACP/RP/SP	40-79
Air Axis/Corridors/Routes	Birds
Battle Positions	A 10-19, B 20-29, C 30-39
Engagement Areas	Animals
Objectives	Colors

Figure H-9. Control measure codes

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

H-24. MISSION BRIEF

- a. Planned and filled out by the company commander.
- b. Battle-rostered crews always fly together.
- c. Backbrief initiated by all PCs.

H-25. FLIGHT PLAN

- a. Filled out by individual crew (unless otherwise directed).
- b. Filled out by team leader or designated crew.
- c. During field operations, crews will be battle-rostered by tail number. The roster will be turned into flight operations before the start of a field exercise. Upon each departure from the AA, first sergeants will ensure that the number of departing aircraft is passed to flight operations.

NOTE: Crews will be reported to flight operations by chalk number; for example, "A Co launching with A/C 1, 2, 4, 6, and 7; no change in tail numbers, over."

H-26. DOPPLER/DATA ENTRY KEYBOARD INFORMATION

- a. Coordinates and altitudes will be obtained by the appropriate planning cell as directed by the S3.
- b. All aircraft will have a strip map of planned routes separate from navigational maps.

H-27. WEATHER AND NOTAM BRIEF

- a. The commander will be briefed by the battalion S2 during the mission order.
- b. Flight operations personnel will update the individual companies as the S2 receives new information.
- c. NOTAMs will include all range information and firing points when operations are being conducted on a military installation.
- d. One aircraft per flight establishes and maintains contact with flight-following ATC.

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

H-28. COMMUNICATIONS SECURITY

- a. Signal operation instructions information will be briefed in the operation order.
- b. The PC will ensure that the aircraft is keyed with the correct codes. Flight commanders are responsible for the supervision of this action.
- c. A COMSEC officer will be appointed by the company commander. During field exercises, the COMSEC officer maintains the keying device and collects the proper codes.

H-29. TIME SEQUENCE

The time sequence will include, as applicable, the following:

- a. Take-off.
- b. Passage points.
- c. Time on station.

H-30. AIRCRAFT FAILURE PRIORITY (DAY AND NIGHT)

The aircraft failure priority is radar altimeter, PNVIS/HDU, weapon system, and navigational systems.

H-31. REJOIN PROCEDURES

Aircraft delayed from departure with the parent company may join the next company up or join at the forward assembly area, holding area, or FARP. The alternative is to remain at the present location and comply with specific instructions covered in the OPORD. No in-flight join ups will be performed at night.

H-32. COMPANY PLANNING CELLS

Company planning cells will be used to expedite mission planning unless the situation precludes it. Each cell will consist of one crew, at a minimum. An alternate crew will be designated to perform the primary crew's functions. Crew cell responsibilities will remain in effect for every mission. Crew cell assignments are as follows:

- a. Navigation/doppler planning.
- b. Communications card.
- c. COMSEC/speech security.

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

- d. Mission graphics.
- e. Fire support and EA fire distribution.
- f. Weather and light data and fuel requirements.
- g. Tactical flight plan preparation and filing.
- h. LO coordination.
- i. Threat.

NOTE: Select personnel may be tasked to assist the battalion planning cell as the situation dictates.

H-33. WARNING ORDER

Figure H-10 is a sample format for a warning order.

1. WARNING ORDER 2. SITUATION a. Brief statement about the enemy situation, friendly situation, or both. b. Attachments and detachments. 3. MISSION (Who, What, When, Where, and Why) 4. COORDINATING INSTRUCTIONS a. Brief statement about the enemy situation, friendly situation, or both. b. Number of aircraft and crew required. c. Aircraft load, ammunition, fuel, and cargo or passengers. d. Special-mission equipment.

Figure H-10. Sample format for a warning order

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

e. Mission-oriented protective posture. f. Earliest time of movement (crank-up and load-up). g. Changes to SOP. 5. SPECIFIC INSTRUCTIONS a. Chain of command. b. Weather (who gets). c. Flight plan (who files and when). d. Coordination, liaison, or special individual tasks. 6. TIME AND PLACE FOR ISSUANCE OF THE OPERATION ORDER a. Location. b. Time. c. Personnel to attend. 7. OTHER a. Time is now _____. b. What are your questions?
--

Figure H-10. Sample format for a warning order (continued)

H-34. OPERATION ORDER

a. References. The mission will be briefed using the appropriate maps/charts. An enlarged schematic of BPs/EAs, and so forth will also be developed and actions at the objective will be briefed.

b. Task Organization. The organization consists of the aircrew, PCs, company, platoon assignments, chalk numbers, and so forth. Figure H-11 shows a sample format for an operation order.

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

1. SITUATION

a. Enemy Forces. Strength, composition, disposition, location, previous actions, and probable courses of action.

b. Friendly Forces.

- (1) Higher (air and ground).
- (2) Adjacent (air and ground).
- (3) Ground unit(s) over which operations will be conducted.
- (4) Supporting units.
- (5) Other aviation elements in the area of operations.

c. Attachments and Detachments.

d. Weather.

- (1) Current weather and light data.
- (2) Forecast weather.
- (3) Special environmental considerations or hazards.
- (4) Published weather minimums for operation.

e. Attachments or Detachments.

2. MISSION (Who, What [attack to destroy, attrit, disrupt, deny avenue of approach, overwatch], When, Where, Why.) READ TWICE.

3. EXECUTION

a. Concept of the Operation (overlay, special attention to engagement area analysis).

- (1) Scheme of maneuver.
- (2) Fires and CAS.

Figure H-11. Sample format for an operation order

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

(3) EW plan. (4) Obstacles that support our plan. (5) Deception plan. (6) Suppression of enemy air defenses. b. <u>Specific Instructions to Subordinate Units.</u> (1) A Company. (2) B Company. (3) C Company. (4) HHC. (5) AVUM. (6) Other. c. <u>Fire Support.</u> (1) FA. (2) JAAT/CAS. (3) ADA. d. <u>Coordinating Instructions.</u> (1) Time schedule. (a) Start. (b) Communication. (c) Hover checks - NOE/HIT. (d) Lineup.
--

Figure H-11. Sample format for an operation order (continued)

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

- (e) Takeoff.
- (f) On-station.
- (g) Relief-on-station.
- (h) Inspections and rehearsals.
- (2) Flight plan filing.
- (3) Ammunition configuration by aircraft and type.
- (4) Flight coordination.
 - (a) Air routes/corridors, ACPs, SPs, route names, rally points, and ASE turn-on points.
 - (b) Traffic patterns: (FARPs, battalion tactical CP, other).
 - (c) Holding area, FAAs, FARPs, firing positions, and kill zones.
 - (d) Doppler presets.
 - (e) Mode of flight, airspeed, and altitude for each leg of flight.
 - (f) Movement technique and formation for occupation of holding areas and battle positions.
 - (g) Direction into HA/BP scheme of maneuver for occupation (light/heavy section).
 - (h) Coordinating altitude and other airspace procedural control measures.
 - (i) Aircraft lighting.
 - (j) IMC breakup procedures.
 - (k) Underwire/underbridge flight.

Figure H-11. Sample format for an operation order (continued)

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

(l) Aircraft in-flight emergency procedures to include recovery points/airfields.

(m) Flight following.

(5) Communications check/lost communications procedures.

(6) Crew endurance.

(7) ECCM.

(8) NBC/MOPP.

(9) Actions on contact.

(10) Air-to-air actions on contact.

(11) Special-mission equipment and mission-essential equipment.

(12) Target priorities.

(13) Authorized mode of operations with degraded weapons/NVD.

(14) Engress criteria.

(15) Downed-pilot procedures (pickup points, times, and signals).

(16) EEI/required FLASH reports.

(17) Debriefing time and place.

(18) Time back.

4. SERVICE SUPPORT

a. Supply.

(1) Class I.

(2) Emergency Class III and Class V resupply points.

Figure H-11. Sample format for an operation order (continued)

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

(3) Location of FARPs (us and any others within 50 kilometers).

(4) Class IX.

(5) Other classes of supply.

(6) Water point and trash point.

b. Services and Transportation.

(1) Location of AVUM.

(2) Contact teams.

(3) Downed aircraft recovery procedures and pilot pickup points.

(4) Road march and convoy procedures.

c. Medical and Personnel Services.

(1) Location of aid station.

(2) Air-ground medical evacuation procedures.

(3) Field sanitation.

(4) Decontamination site.

5. COMMAND AND SIGNAL

a. Command.

(1) Chain of command.

(2) PC and seat designation.

(3) Locations of flight operations center and battalion CPs.

(4) Proposed location for the assembly area.

Figure H-11. Sample format for an operation order (continued)

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

- (5) Location of the main/tactical CP.
- (6) Command group location.
- b. Signal.
 - (1) Signal operation instructions in effect.
 - (2) Secure radio codes.
 - (3) IFF. Turn-on and turn-off lines.
 - (a) Mode 3A.
 - (b) Mode 4.
 - (4) Laser codes.
 - (5) Code word or password.
 - (6) Send-a-message system.
 - (7) Meaconing, intrusion, jamming, and electronic counter-countermeasures.
 - (8) Lost communications procedures.
 - (9) Tactical air and JAAT frequencies.
 - (10) Tactical beacons and navigational aids.
 - (11) Frequencies.
 - (12) Scales.
 - (13) Communications card check.
 - (14) Call sign assignment/verification.
 - (15) Hush status.

Figure H-11. Sample format for an operation order (continued)

6. SAFETY

- a. Time is now _____.
- b. What are your questions?

NOTE 1: All aircrews will have complete graphics. Platoon leaders will conduct spot inspections.

NOTE 2: Ensure mission brief is completed before departure. Air mission commander will review form for correct entries.

Figure H-11. Sample format for an operation order (continued)

TAB A, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
MISSION BRIEF (PREMISSION PLANNING)

H-35. DEBRIEFING FORMAT

Figure H-12 is a sample format for a debriefing.

1. SITUATION
a. <u>Enemy Situation Encountered.</u>
(1) Size and type: Div___Reg___Bn___Co___Plt___Sec___ Other_____.
(2) Location (grid): _____.
(3) Weapons and vehicles: SA-7___ZSU-23-4___SA-2___SA-3___ SA-6_____. SA-9___SA-11___BMP___BTR___ T-62___T-72_____. 152-mm___122-mm___ Other_____.
(4) Enemy aircraft: Rotary-Wing_____. Fixed-Wing_____.
(5) Enemy actions on contact: _____.
(6) NBC activity and indicators: MOPP level_____. Type_____.
(7) EW and OPSEC activities: Type_____. How_____.
(8) Supply and logistic capabilities noted: Size_____. Type_____.
(9) Strengths and weaknesses noted: Method fought_____.
(10) Brigade: Destroyed_____ Damaged_____.

Figure H-12. Sample format for a debriefing

TAB B, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
DEBRIEFING FORMAT

b. <u>Terrain</u> (Emphasis on engagement area analysis).	
Cover_____	Concealment_____.
Type of Soil_____	Remarks_____.
c. <u>Friendly Forces Encountered</u> .	
(1) Size and type: Div___ Reg___ Bn___ Co___ Plt___ Sec___ Other___.	
(2) Location (grid): _____.	
(3) USAF elements employed or encountered: Type_____.	
(4) Effectiveness of air strikes and CAS (BDA): Destroyed___. Damaged_____.	
d. <u>Weather and Light Data</u> . (Significant differences from initial briefing.) Cloud cover, wind, and so forth _____.	
2. MISSION	
a. Mission complete as briefed? Yes___ No___ Comments_____.	
b. FRAGOs received: Yes___ No___ If yes, how many___ Time_____. Effect/Comments_____.	
3. EXECUTION OR CONCEPT OF OPERATION	
a. <u>Maneuver</u> (General Overview).	
(1) Routes flown: Unsuspected enemy engagement and comments_____.	
(2) Movement techniques used: _____.	
(3) Control measures used: _____.	
(4) Times of departure and return: _____.	
(5) Map corrections: _____.	

Figure H-12. Sample format for a debriefing (continued)

TAB B, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
DEBRIEFING FORMAT

b. <u>Fires.</u> (1) Artillery mission called (unit employed): Time lines____. (2) Preplanned targets used: On target_____. (3) Artillery effectiveness: _____. (4) Friendly ADA positions noted: _____. (5) Significant problems noted: _____. c. <u>Flight Coordination.</u> (1) Essential elements of information noted: _____. (2) Friendly aircraft downed: Yes___ No___ If yes, reason(s)_____. (3) Crews recovered or probable pilot pickup point: _____. 4. SERVICE SUPPORT a. Status of FARPs in the area of operations, if known: Up___ Down___ Comment_____. b. Hours flown: _____. c. Class V consumed (by type of ammunition): _____. d. Mission status of aircraft: Mission ready___ No___ Comment___ _____. e. Immediate maintenance requirements: _____. f. Crew status (injuries and endurance): _____. g. Location of injured crew members: _____. 5. COMMAND AND SIGNAL a. Chain of command (location): _____.

Figure H-12. Sample format for a debriefing (continued)

TAB B, APPENDIX 2, ANNEX A (COMMAND AND CONTROL)
DEBRIEFING FORMAT

b. Locations of flight operations center and tactical operations center: _____. c. Aircraft and crew assignments: _____. d. Instructions for crews (premission planning): _____. 6. CONCLUSIONS AND RECOMMENDATIONS _____ _____ _____ _____

Figure H-12. Sample format for a debriefing (continued)

APPENDIX 3 TO ANNEX A TO A TACTICAL SOP
LIAISON

H-36. GENERAL

Good liaison officers are essential in planning effective, coordinated combat operations. They must understand every aspect of our mission and the mission of units operating with us. To do this, they must know what questions to ask and learn to anticipate what questions will be asked of them. The LO is an extension of the commander and S3 because he personally represents the commander. His actions may make the difference between the success and failure of a mission. The LO must have an assigned vehicle, radios, and a driver. Depending on the mission requirements and time constraints, he may be given a dedicated OH-58.

H-37. DUTIES AND RESPONSIBILITIES

a. The LO works as an assistant S3 and is intimately involved in the planning and sometimes the execution process of all missions. Through personal contact, he promotes cooperation and coordination of effort and exchanges essential information with adjacent and higher units. He must educate those with whom he is working on the special contributions he can make and how his talents and knowledge can best be used.

b. Tactical and technical expertise is the most important part of an LO's job. He must keep himself up to date on our capabilities, mission, current and expected tactical situation, locations, and plans and disposition and then translate this information to the unit with which he is coordinating. A good LO takes the initiative. He does not wait for things to happen; he makes them happen.

H-38. GUIDELINES

a. The guidelines given below must be followed to help ensure complete coordination.

(1) Maintain the capability to contact the battalion S3 or main CP at all times and keep the S3/main CP continuously informed as to your current and planned location.

(2) Before departing any location (ours or theirs), coordinate with all primary and secondary staff sections and the message/communications section, if applicable.

(3) Know what is in this SOP.

(4) Always take notes.

b. Specific guidance for LOs comes from the S3 based on the mission; however, the checklist in this appendix provides a guide that will ensure that all necessary coordination is accomplished.

APPENDIX 3 TO ANNEX A TO A TACTICAL SOP
LIAISON

H-39. LIAISON OFFICER CHECKLIST

Figure H-13 is a sample format for a liaison officer checklist.

--Time Hack--				
1. ACTIONS PRIOR TO DEPARTURE TO SUPPORTED UNIT				
a. Location of the Unit to be Supported.				
b. Point of Contact.				
c. Frequency and Call Sign (present and future).				
d. Challenge and Password (present and future).				
e. Unit Status (as it affects battalion mission capabilities).				
(1) Aircraft status.				
	<u>MC</u>	<u>MC in 12 Hours</u>	<u>MC in 24 Hours</u>	<u>Effect on Mission</u>
AH-64	_____	_____	_____	_____
OH-58	_____	_____	_____	_____
UH-60	_____	_____	_____	_____
(2) Personnel status.				
(3) Communications.				
(a) Interpreter.				
(b) Security equipment.				
f. Locations.				
(1) Main CP and tactical CP (current and proposed).				
(2) Subordinate units.				
(3) FARP (current and proposed).				

Figure H-13. Sample format for a liaison officer checklist

APPENDIX 3 TO ANNEX A TO A TACTICAL SOP
LIAISON

g. Intelligence.

- (1) Enemy situation (obtain graphics).
- (2) Locations.
- (3) Intentions/probable course(s) of action.
- (4) Frequencies and call signs for intelligence nets.
- (5) Availability of intelligence.
- (6) Weather.
- (7) Reconnaissance photos and other assets.

h. Mission.

- (1) Special-mission or equipment requirements.
- (2) Understanding the mission.
- (3) Copy of graphics/OPORD.
- (4) REDCON status.
- (5) Effects of weather.
- (6) IFF codebook edition.

i. Specific Requirements.

- (1) Map, acetate, markers, notepad.
- (2) Aircraft or vehicle.
- (3) Radio and SOI.
- (4) Personal gear/hygiene articles.

Figure H-13. Sample format for a liaison officer checklist (continued)

APPENDIX 3 TO ANNEX A TO A TACTICAL SOP
LIAISON

(5) Flight gear. (6) Rations/water. j. General Information. (1) Friendly ADA locations. (2) Friendly ground units in our AO and, specifically, our BPs. Unit designation/location/call signs/frequencies and mission. (3) FA-delivered mine availability. Copperhead. (4) Decontamination sites - primary/alternate/link-up point/call signs and frequencies. (5) Decision point to launch our mission. (6) Boundaries and necessary coordination. (7) CAS availability. Call signs and frequencies. (8) Aircraft recovery. Coordination. (9) Availability of laser designators. Codes. Call signs and frequencies. (10) Determine if the enemy's use of NBC agents has increased. (11) Determine the kind of early warning that can be received from corps, division, or brigade. 2. ACTIONS AT SUPPORTED UNITS a. <u>Hasty/Deliberate Attacks.</u> [] Results desired (destroy, attrit, and so forth) [] Ground commander's intent.
--

Figure H-13. Sample format for a liaison officer checklist (continued)

APPENDIX 3 TO ANNEX A TO A TACTICAL SOP
LIAISON

- [] Ground scheme of maneuver (OBTAIN GRAPHICS).
 - BPs/sectors.
 - Alternate/subsequent BPs/limits of advance.
 - Main CP/tactical CP locations (down to battalion or task force).
 - AAs and trains locations.
 - Decontamination sites (actual/proposed).
 - Fuel points (JP4, diesel).
 - Subordinate units' communications information (today and tomorrow).
 - ADA locations/communications information/IFF codes.
 - Passage-point information.
- [] Fire support (types and locations, including mortars)
 - Communications information (today and tomorrow).
 - Laser designator information.
- [] Mobility/countermobility
 - Locations and purposes of obstacles (OBTAIN GRAPHICS).
 - Locations of aerially delivered mines and type (long/short).
 - Friendly river crossing sites.
- [] CAS/TACAIR
 - Availability of CAS.
 - Suggested primary and alternate IPs.

Figure H-13. Sample format for a liaison officer checklist (continued)

APPENDIX 3 TO ANNEX A TO A TACTICAL SOP
LIAISON

• Coordination with ALO. • Initial briefing information. ☐ Our mission • Who we work with. • The type of support we can give them. • The type of support they can give us. • The commander's intent. • The implied missions. • Airspace control measures. ☐ Decision points. ☐ NAIs/TAIs. --COMPARE TIME HACK-- b. <u>Cross FLOT.</u> ☐ H hour. ☐ SEAD. • Method of control. • Time sequence. • Jamming/EW. • USAF/other. • Supporting artillery. ☐ Communications.

Figure H-13. Sample format for a liaison officer checklist (continued)

APPENDIX 3 TO ANNEX A TO A TACTICAL SOP
LIAISON

- ☐ Passage points.
 - Friendly AD information.
 - Ground unit locations, communications information.
 - Signals/coordination (who with, communications, location).
- ☐ Downed aviator recovery.
- ☐ Real time intel pushed to cockpit.
- ☐ Air routes/corridors.
- ☐ Decision points.
- ☐ NAIs/TAIs.
- ☐ Actions at engagement area.
 - Alternate targets.
 - Limit advance.

--TIME HACK--

c. Rear Battle.

- ☐ The rear area commander and his plan.
- ☐ Communications.
- ☐ The threat.
- ☐ Possible enemy avenues of approach/LZs/DZs.
- ☐ Priorities for protection.
- ☐ Location of units in our area of responsibility.
- ☐ ADA locations/call signs/frequencies.

Figure H-13. Sample format for a liaison officer checklist (continued)

APPENDIX 3 TO ANNEX A TO A TACTICAL SOP
LIAISON

- ☐ Fire support (FA, mortars, CAS).
- ☐ Advise about our strengths and weaknesses for rear battle.
 - Reaction time.
 - Ineffectiveness against troops on ground.
 - Need to catch enemy in the air.
 - Screens.
- ☐ Discuss and become an expert on the rear area commander's security plan.
 - Base clusters.
 - Communications

Figure H-13. Sample format for a liaison officer checklist (continued)

APPENDIX 4 TO ANNEX A TO A TACTICAL SOP
PRECOMBAT CHECKS

H-40. GENERAL

a. Using the precombat checklist, the inspection will be executed in the following manner:

(1) Individual inspections of unit personnel will be conducted by the first-line supervisors and monitored by company evaluators.

(2) General inspections of unit vehicles, aircraft, and equipment will be conducted by the first-line supervisors and monitored by the appropriate evaluators.

(3) Armament, communications, loading plans, operator's vehicle maintenance tools, and miscellaneous equipment inspections will be conducted by the appropriate first-line supervisors and monitored by the appropriate evaluators.

(4) Company and individual sections prepare for combat inspection and coordinate for the presence of the evaluator and his assistants.

b. Evaluators will submit separate reports to the chief evaluator.

H-41. INSPECTION RESULTS

The company evaluator will complete a precombat inspection packet for each concerned commander. Each inspection packet will contain the following items:

- A completed company precombat checklist. (All items must be marked with a yes, no, or N/E [not evaluated] in the rating block.)
- A list of all deficiencies noted (even in overall satisfactory ratings).
- Reports of technical inspections using PMCS criteria.
- An overall summary covering the major strengths and weaknesses of the inspected unit.

APPENDIX 4 TO ANNEX A TO A TACTICAL SOP
PRECOMBAT CHECKS

H-42. PRECOMBAT CHECKLIST

Figure H-14 shows a sample format for a precombat checklist.

	<u>YES</u>	<u>NO</u>	<u>N/E</u>
1. PERSONNEL			
a. Full crew of vehicles.	_____	_____	_____
b. Crew members knowledgeable of the mission.	_____	_____	_____
c. Attitude/morale of the soldiers high.	_____	_____	_____
2. PERSONAL EQUIPMENT			
a. Dog tags present and worn.	_____	_____	_____
b. Identification card and meal card (if issued) present and serviceable.	_____	_____	_____
c. Proper field uniform worn.	_____	_____	_____
d. All TA-50 present and current per the tactical SOP.	_____	_____	_____
e. Personal weapons carried/secured (45s to LBE).	_____	_____	_____
f. Weapons serial numbers known.	_____	_____	_____
g. Two flashlights on each vehicle.	_____	_____	_____
h. Cat eyes on back of helmet bands.	_____	_____	_____
i. Name on camouflage bands and helmet rank present.	_____	_____	_____
j. Each leader has a notebook, pencil or pen, and grease pencil.	_____	_____	_____

Figure H-14. Sample format for a precombat checklist

APPENDIX 4 TO ANNEX A TO A TACTICAL SOP
PRECOMBAT CHECKS

	<u>YES</u>	<u>NO</u>	<u>N/E</u>
3. INTELLIGENCE			
a. Crew members knowledgeable of their places in the unit and the unit's place in the organization.	_____	_____	_____
b. All maps posted.	_____	_____	_____
c. Crew members know the sign and countersign.	_____	_____	_____
d. All leaders have list of their subordinate's weapons and sensitive items by serial number and vehicle/person.	_____	_____	_____
e. All vehicle bumper numbers legible.	_____	_____	_____
4. NBC EQUIPMENT			
a. NBC suit present and serviceable.	_____	_____	_____
b. Protective mask carried, fitted, and serviceable.	_____	_____	_____
c. NBC boots present and serviceable.	_____	_____	_____
d. NBC gloves present and serviceable.	_____	_____	_____
e. M258 decontamination kit present on each person.	_____	_____	_____
f. M11 decontamination apparatus in each vehicle.	_____	_____	_____
g. Soldiers wearing glasses have mask inserts.	_____	_____	_____
h. M256 chemical detection kit present and complete per assigned vehicle (NBC detection teams).	_____	_____	_____

Figure H-14. Sample format for a precombat checklist (continued)

APPENDIX 4 TO ANNEX A TO A TACTICAL SOP
PRECOMBAT CHECKS

	<u>YES</u>	<u>NO</u>	<u>N/E</u>
i. Crews knowledgeable of MOPP levels and alert warning procedures and signals.	_____	_____	_____
j. NBC survey teams identified and knowledgeable of equipment. Assigned unit equipment is present and serviceable.	_____	_____	_____
k. NBC markers for contaminated areas present.	_____	_____	_____
l. Crew knowledgeable of preparation of vehicle and nuclear blast.	_____	_____	_____
5. COMMUNICATIONS			
a. SOI on each vehicle with radio (as available).	_____	_____	_____
b. Correct frequencies on each radio.	_____	_____	_____
c. Frequency and call signs known by crew.	_____	_____	_____
d. Antenna properly laced, secured, and protective tip installed and tied down.	_____	_____	_____
e. Leaders knowledgeable on time to change frequencies.	_____	_____	_____
f. Leaders can use authentication and encoding table.	_____	_____	_____
6. VEHICLE AND EQUIPMENT			
a. All weapons mounted and operational.	_____	_____	_____
b. Headspace and timing gauge present and serviceable.	_____	_____	_____
c. Spare barrel and equipment present and serviceable.	_____	_____	_____

Figure H-14. Sample format for a precombat checklist (continued)

APPENDIX 4 TO ANNEX A TO A TACTICAL SOP
PRECOMBAT CHECKS

	<u>YES</u>	<u>NO</u>	<u>N/E</u>
d. Weapon-cleaning equipment present and sufficient on each vehicle (one per weapon).	_____	_____	_____
e. Crew can set headspace and timing on M-2s.	_____	_____	_____
f. Load plans posted on vehicles.	_____	_____	_____
g. All equipment inside of combat vehicle is strapped down.	_____	_____	_____
h. TA-50 and BII properly stowed per load plan (or -10 manual).	_____	_____	_____
i. Vehicle topped off with gasoline.	_____	_____	_____
j. Oil and water cans filled.	_____	_____	_____
k. Camouflage nets and poles complete, serviceable, and secured on each vehicle.	_____	_____	_____
l. Canvas installed on trucks.	_____	_____	_____
m. Night observation devices with batteries operational.	_____	_____	_____
7. MAINTENANCE			
a. Logbook and dispatch on the vehicle.	_____	_____	_____
b. Lubrication order and -10 present on vehicle and serviceable.	_____	_____	_____
c. PMCS completed and a daily DA Form 2404 filled out correctly.	_____	_____	_____
d. Deferred maintenance DA Form 2404 filled out correctly.	_____	_____	_____
e. Crews know how to perform B, D, and A PMCS correctly.	_____	_____	_____

Figure H-14. Sample format for a precombat checklist (continued)

APPENDIX 4 TO ANNEX A TO A TACTICAL SOP
PRECOMBAT CHECKS

	<u>YES</u>	<u>NO</u>	<u>N/E</u>
f. All external and internal lights operational.	_____	_____	_____
g. Oil and water levels correct.	_____	_____	_____
h. Vehicle batteries clean, cables tight, and electrolyte levels correct.	_____	_____	_____
i. All vehicle weapons cleaned (no rust).	_____	_____	_____
j. Fire extinguishers serviceable, current, and functional.	_____	_____	_____
k. Each vehicle has at least one complete change of batteries for all of its flashlights.	_____	_____	_____
8. AIRCRAFT CREW MEMBERS			
a. AR 95-1 crew requirements met for mission to be flown.	_____	_____	_____
b. Crew members within limits of crew rest policy.	_____	_____	_____
c. PCs on current orders for mission to be flown.	_____	_____	_____
d. Mission brief completed by authorized personnel.	_____	_____	_____
e. Flight plan filed, NOTAMS checked, weather forecast received, PPC filled out, weight and balance verified, and mission backbrief completed.	_____	_____	_____
f. Survival vest for all crew members is available and one PRC-90 per aircraft is available.	_____	_____	_____

Figure H-14. Sample format for a precombat checklist (continued)

APPENDIX 4 TO ANNEX A TO A TACTICAL SOP
PRECOMBAT CHECKS

	<u>YES</u>	<u>NO</u>	<u>N/E</u>
g. SOI for each aircraft.	_____	_____	_____
h. Hazards and no-fly areas posted on navigational maps.	_____	_____	_____
9. AIRCRAFT EQUIPMENT			
a. Preflight inspection conducted; logbook present.	_____	_____	_____
b. Checklist, -10, and all mission-related publications are available.	_____	_____	_____
c. MOPP gear is on aircraft.	_____	_____	_____
d. One canteen available for each crew member.	_____	_____	_____
e. All flying gear is stowed in aircraft.	_____	_____	_____
f. All helmet sights and aircraft weapons systems are functional (AH only).	_____	_____	_____
g. Laser glasses available for each crew member.	_____	_____	_____
10. MISCELLANEOUS			
a. Field sanitation team identified and knowledgeable; equipment present, serviceable, and in sufficient quantities.	_____	_____	_____
b. Eye protection available in those wheeled vehicles without glass.	_____	_____	_____
c. Rations issued, if required.	_____	_____	_____
d. Ammunitions issued, if required.	_____	_____	_____
e. MILES equipment present, serviceable, and operational, if required.	_____	_____	_____

Figure H-14. Sample format for a precombat checklist (continued)

APPENDIX 4 TO ANNEX A TO A TACTICAL SOP
PRECOMBAT CHECKS

	<u>YES</u>	<u>NO</u>	<u>N/E</u>
11. SPECIAL REQUIREMENTS			
a. <u>Personal Knowledge</u> . Every member of this command knows the following information:			
(1) Chain of command.	_____	_____	_____
(2) Job assignment/duties.	_____	_____	_____
(3) Weapon serial number.	_____	_____	_____
(4) Weapon zero information (M16).	_____	_____	_____
(5) General orders.	_____	_____	_____
(6) MOPP levels.	_____	_____	_____
(7) Four life-saving steps.	_____	_____	_____
b. <u>Required Equipment</u> . Every member of this command must wear (or have nearby) the following equipment during all tactical/ combat operations. (See Tab A.)			
(1) Individual weapons.	_____	_____	_____
(2) Assigned protective mask.	_____	_____	_____
(3) Complete LBE or survival vest (as applicable).	_____	_____	_____
(4) Kevlar helmet with cover.	_____	_____	_____
(5) MOPP gear.	_____	_____	_____
(6) Individual flight gear (as applicable).	_____	_____	_____
(7) Identification card and tags to include medical-alert tags.	_____	_____	_____

Figure H-14. Sample format for a precombat checklist (continued)

TAB A, APPENDIX 4, ANNEX A (COMMAND AND CONTROL)
FIELD UNIFORM

H-43. FIELD UNIFORM

The field uniform will be worn as shown in Figure H-15.

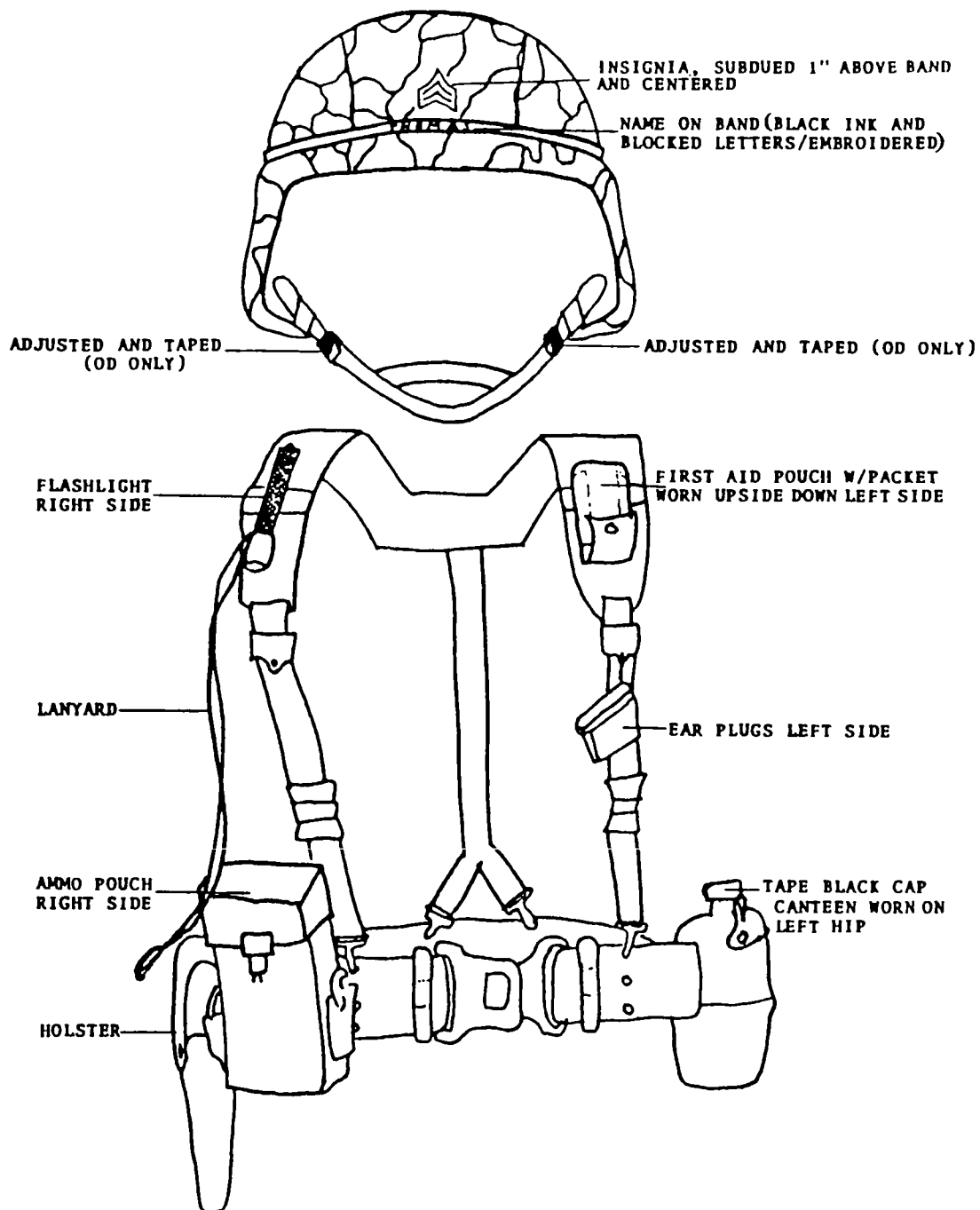
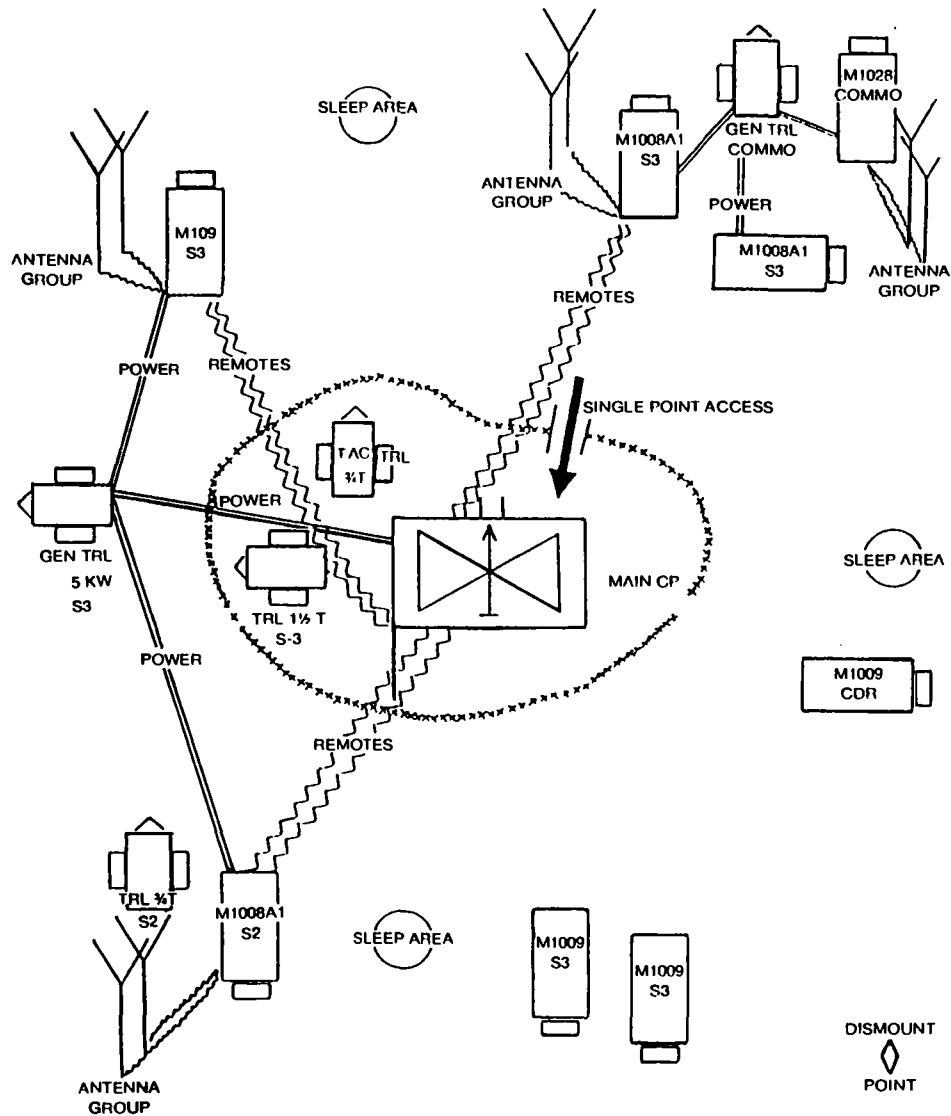


Figure H-15. Field uniform

TAB A, APPENDIX 4, ANNEX A (COMMAND AND CONTROL)
AREA LAYOUT

H-44. MAIN CP AREA LAYOUT

The main CP area layout will be as shown in Figure H-16.



NOTE 1. NOT TO SCALE DISPERSION METT-T DEPENDENT.

NOTE 2 THE MAIN CP WILL BE CENTRALLY LOCATED AND THE REMAINING ELEMENTS PLACED TO PROVIDE 360° SECURITY.

NOTE: Dispersion depends on the factors of METT-T. The main CP will be centrally located and the remaining elements placed to provide 360-degree security.

Figure H-16. Main CP area layout

TAB A, APPENDIX 4, ANNEX A (COMMAND AND CONTROL)
MAIN CP CONFIGURATION

H-45. MAIN CP CONFIGURATION

Configuration of the main CP will be as shown in Figure H-17.

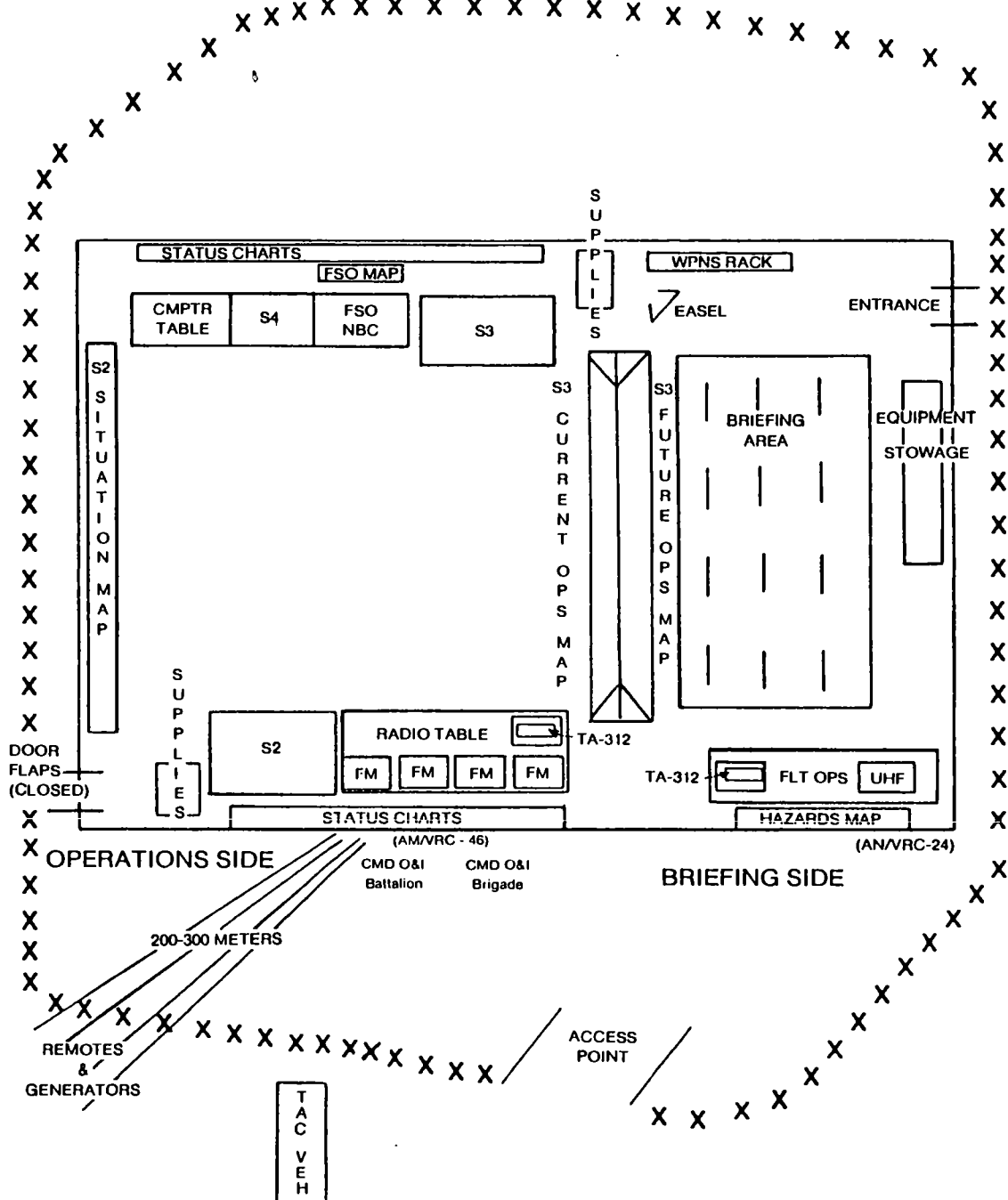


Figure H-17. Main CP configuration

TAB A, APPENDIX 4, ANNEX A (COMMAND AND CONTROL)
AREA LAYOUT

H-46. REAR CP AREA LAYOUT

Rear CP area layout will be as shown in Figure H-18.

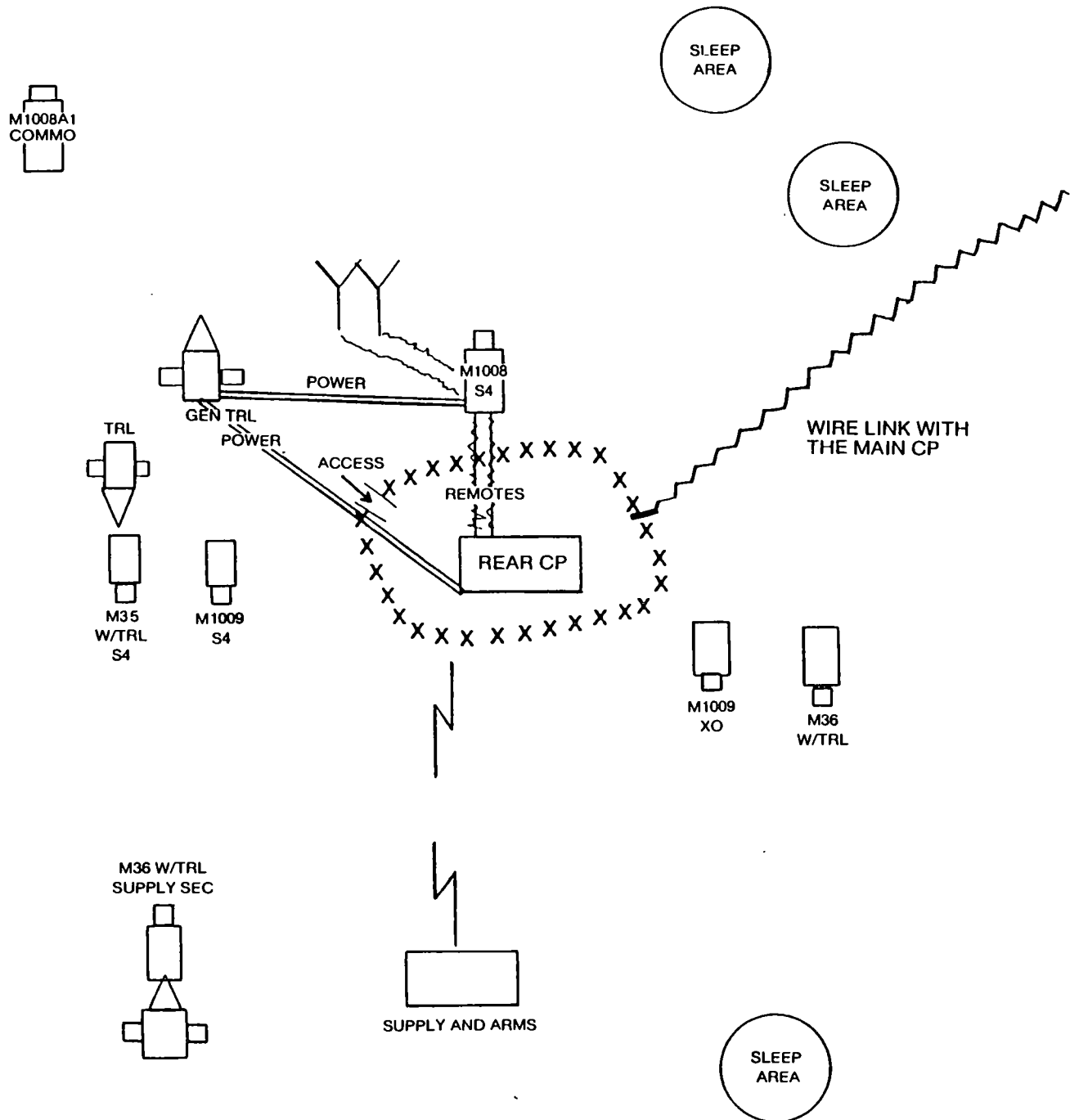
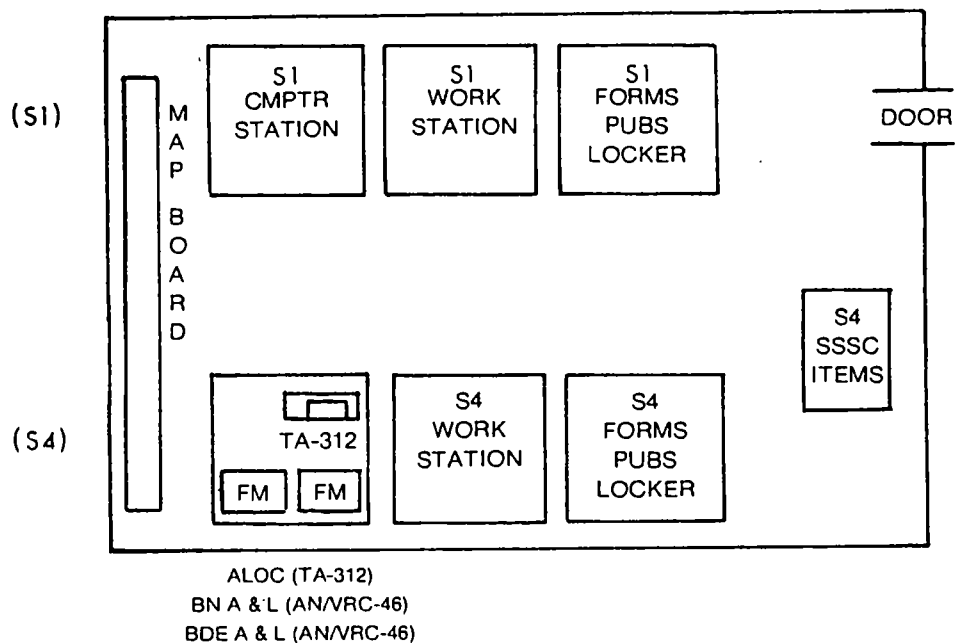


Figure H-18. Rear CP area layout

TAB A, APPENDIX 4, ANNEX A (COMMAND AND CONTROL)
REAR CP CONFIGURATION

H-47. REAR CP SET-UP

Set-up of the rear CP will be as shown in Figure H-19.



TAC SETUP
 (3/4 TON TRAILER)
 W/BUILDUP

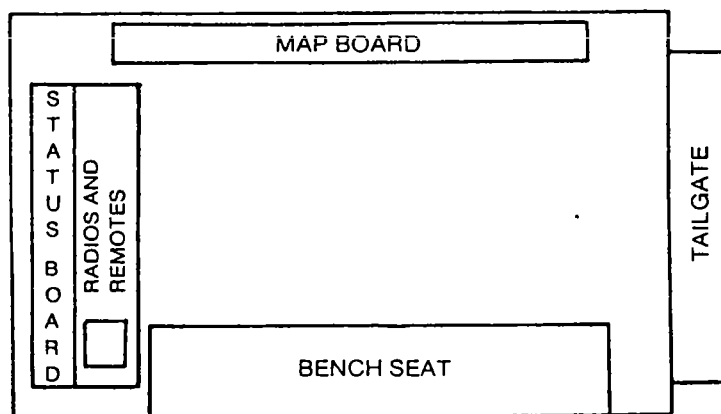


Figure H-19. Rear CP set-up



1
2
3



4

5



Appendix I

TARGET COORDINATION AND LASER DESIGNATION

For effective employment of attack helicopter units, standardized target handover procedures for aeroscout and attack aircraft must be established. Essentially, these procedures will remain the same for ATKHBs equipped with the AH-1 or the AH-64. However, certain elements will be modified for AH-64 units.

Section I

TARGET HANDOVER

I-1. PROCEDURES FOR THE AH-1

a. Target handovers between aeroscout and attack helicopters include five elements. These elements are the alert and target description, target location, method of attack, execution, and postattack action.

(1) Alert and target description. This alerts the attack helicopter crew that a target handover is about to occur; identifies the sender; and describes the target by type, number, and activity.

(2) Target location. The aeroscout gives the direction of the target in degrees and range from the BP. The aeroscout may reference from a known point (TRP or EA) or use grid coordinates.

(3) Method of attack. The aeroscout describes the ATKHC commander's planned scheme of maneuver, fire distribution, and maneuver for the attack.

(4) Execution. The aeroscout gives either the command to initiate the attack by saying "Fire" or having the attack helicopter fire when ready.

(5) Postattack action. Once an engagement is complete, the attack helicopter will move to subsequent BPs, HAS, or as briefed by the ATKHC commander's order.

b. The following is a step-by-step example of a target handover:

(1) Alert and target description. "K13 (AH-1), this is K06 (OH-58). Three T-80s and four BMPs moving west."

(2) Target location. "One hundred and twenty degrees at 2,500 meters."

(3) Method of attack. "Attack targets west of north-south road."

(4) Execution. "Engage when ready."

(5) Postattack action. "Move to HA 4; on order, attack from BP 21."

I-2. PROCEDURES FOR THE AH-64 AND ARMED OH-58D

When rockets or machine guns/cannons are being fired, the elements of information required for a target handover for engagement by an AH-64 or an OH-58D are the same as those for the AH-1. The major change occurs when information is required for a target engagement employing the Hellfire missile. The following paragraphs contain essential information for a Hellfire target handover.

a. Remote Hellfire Mission Request.

(1) Voice remote. At times, the designating aircraft may be required to use a voice request when transmitting to Hellfire-equipped aircraft that do not have an ATHS. Figures I-1 and I-2 provide the proper voice requests for Hellfire launches.

(OH-58D to AH-64)	
PROCEDURE	DESCRIPTION
<u>Alert</u>	Example: "B29, this is B62. Remote."
(Upon hearing the remote alert, the firing crew knows that a remote laser designates for Hellfire.)	
<u>Target location plus firing angle.</u>	Three options follow:
(The firing crew needs the laser-to-target line to figure the separation angle between the designator and the launcher. To do this, the launcher must enter the location of the target into the fire control computer, align the aircraft to the target, and compare its azimuth to that of the designator LTL. This must not exceed the maximum allowable separation angle. If designator positions are known, LTL and these calculations are not needed.)	1. Preplanned target and LTL stored in the launcher fire control computer. ("Target 1, 350°.") 2. State target grid and LTL. ("Grid XY123456, 350°.") 3. State engagement area and LTL. ("EA Fox, 350°.")

Figure I-1. Procedures for Hellfire launches

<u>Firing method, if applicable:</u>	Assume "indirect" unless "direct" is stated.
<u>Firing mode, if applicable:</u>	Assume "single" unless "rapid" or "ripple" is stated. Assume "LOAL" unless "LOBL" is stated.
<u>Number of rounds, if applicable:</u>	Assume "one round" unless stated otherwise.
<u>Laser code, if applicable:</u>	Code A through H (ripple 2 codes). Assume this is the designator's code, and request "remote" Hellfire mission unless otherwise stated. (Paragraph I-6 discusses laser coding procedures.)
<u>Time interval between missiles, if applicable:</u>	Assume "10 seconds" unless stated otherwise.
<u>Execution:</u>	Always "at my command" unless stated otherwise.

Figure I-1. Procedures for Hellfire launches (continued)

LAUNCHER WITHIN MISSILE LAUNCH CONSTRAINTS	LAUNCHER NOT WITHIN MISSILE LAUNCH CONSTRAINTS
(Launcher to Designator)	(Launcher to Designator)
1. "Ready." "Over." (Lets the designating crew know that the launcher is in position and ready to fire.)	1. "Accept." "Over." (Lets the designating crew know that the firing crew is accepting the mission but is not in position to fire.)
	or
(Designator to Launcher)	"Ready." "Over." (Lets the designating crew know that the firing crew is in position and ready to fire.)

Figure I-2. Example of voice request procedures for Hellfire launches

2. On receipt of a "Ready" call, state "Fire." "Over."

(Launcher to Designator)

(Designator to Launcher)

3. "Shot." "Over." (On receipt of this call, the designating crew lases the target unless delayed or offset lasing is used.)

2. On receipt of a "Ready" call (if the designating crew has not computed missile time of flight for delayed or offset lasing), state "Fire, request laser on."

(Designator to Launcher)

(Launcher to Designator)

4. "Shot." "Over." (The designator lases the target until missile impact, until the "laser-off" call, or for 20 seconds beyond expected missile time on target.)

3. "Laser on." (The designator lases the target until missile impact, until the "laser-off" call, or for 20 seconds beyond expected missile time on target.)

NOTE: If another target is located in the same area, an additional missile will be fired if the designator transmits a "Repeat" call to the launcher. This call gives the designator one additional missile. If more than one additional missile is required, the number of missiles is also transmitted ("Repeat, three missiles").

Figure I-2. Example of voice request procedures for Hellfire launches (continued)

(2) Digital remote. OH-58D aircraft have an ATHS incorporated in the avionics package. The ATHS provides several automatic functions that help relay Hellfire mission request information to the attack helicopter quickly (Figure I-3). A typical digital remote Hellfire mission request is given below.

(a) When the designator forwards the fire request, the launcher is given the target grid, laser code, number of rounds, firing mode (LOAL or LOBL), and requester identifier. If no change in target data is required, then the mission can be completed in both aircraft by pushing one key--the send key. All mission commands will sequence automatically to the next command to be sent.

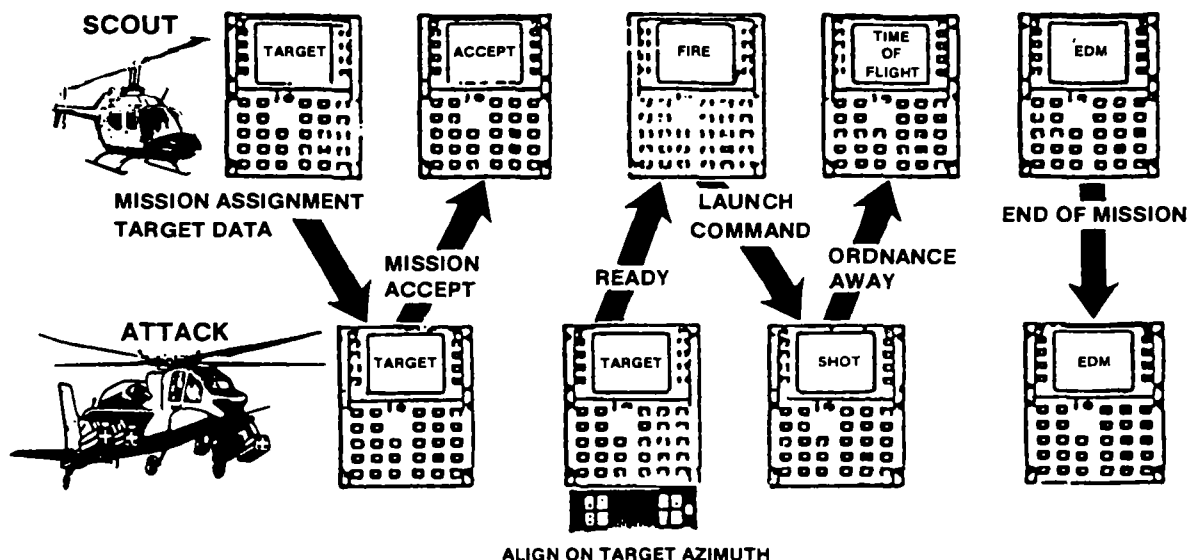


Figure I-3. ATHS Hellfire mission request

(b) Once the firing crew receives the fire request, it must decide if the mission can be accepted. If the mission can be accepted, the crew determines if the mission is within launch constraints. If so, an "Accept" message is sent. If the firing crew is in constraints or has moved to get into constraints following an "Accept" message, it sends a "Ready" message. The "Ready" message lets the designating crew know that the firing crew is prepared to fire. The designating crew sends a "Fire" message when it has identified a target that will be exposed for the time of flight of the Hellfire. If delayed lasing is not being used, the designating crew lases the target when the "5-Shot" message is sent. Lasing continues uninterrupted until missile impact, the "laser-off" call, or for 20 seconds beyond the expected missile time on target.

(3) ATHS calculations. The ATHS calculates a number of variables that aid in ensuring a proper Hellfire launch. In its first request for fire, the designating crew sends its position and the location of the target. The ATHS in the launcher then calculates range to the target, missile time of flight, and separation angle between the designator and the launcher. When the "Ready" message is transmitted back to the designating crew, time of flight, separation angle, and missile time of flight are automatically shown on the multifunction display. When the "Shot" message is transmitted to the designator, the ATHS in both the designator and the launcher start a simultaneous countdown of missile time of flight to impact. This helps the crew determine the correct lasing time for offset or delayed lasing.

b. Autonomous AH-64 Target Engagements. Target handovers for autonomous AH-64 engagements can be transmitted verbally or digitally. Both procedures

are basically the same as those used in OH-58C and AH-1 aircraft. The OH-58D differs from the OH-58C and AH-1 because the laser on the OH-58D can be used to illuminate or locate the target. Lasing to illuminate the target or target-locate gives an 8-digit grid coordinate.

(1) By illuminating the target, attack aircraft crews are able to use the LST in the AH-64 or the ALT in the AH-1 to lock-on the target quickly. Target illumination is the best method to use to obtain an 8-digit grid coordinate because when the target is illuminated, the attack aircraft crew does not require scanning time.

(2) If target illumination is not feasible, the next best method to obtain an 8-digit grid coordinate is to target-locate. Once the data is transmitted in the handover, the attack helicopter crew can enter this data in the fire control computer, prepoint the sighting system to the target grid, and unmask the aircraft to detect the target.

(3) If the designating crew is unable to use either of these methods, it can employ the older method of target location, which is to give the direction and distance from a known location. The following procedural examples in Figure I-4 are a guide to ensure proper target handovers.

PROCEDURE	EXAMPLE
Alert plus target description.	"B29, this is B62. Three tanks on road."
Identify target location.	1. Laser spot. (State "Offset," if needed), give laser code A - H (if needed), and state "Tracker." 2. State grid. (Use the most accurate means available--laser or doppler.) 3. State engagement area (if preplanned). 4. State direction of target plus target distance from a known location.

Figure I-4. Target handover procedures

Method of attack, if applicable.	Type of fire and fire distribution. "Engage left to right; priority to C ³ vehicles from battle position 10."
Execution.	"At my command, attack at will."

Figure I-4. Target handover procedures (continued)

(4) The following are examples of target handovers:

- "Launcher, this is designator. Tank, tracker. Attack at will. Over. Designator, this is launcher. Roger. Out."
- "Launcher, this is designator. Two tanks, tracker offset left 20 meters; left tank first, at my command. Over. Designator, this is launcher. Roger. Over. Launcher, this is designator. Unmask and attack. Over. Designator, this is launcher. Roger. Out."
- "Launcher, this is designator. BMP in the tree line, grid AB12345678. Attack at will. Over. Designator, this is launcher. Roger. Out."
- "Launcher, this is designator. Column of tanks, 160 degrees 4,000 meters. Engage left to right. Attack at will. Over. Designator, this is launcher. Roger. Out."

Section II

TACTICAL GUIDELINES AND PROCEDURES

I-3. LASER DESIGNATION PROCEDURES

Laser designators provide target spotting for precision-guided munitions. Several factors, such as the environment, type of target, target reflectivity, and designator beam characteristics, affect laser employment. The designating crew must know the effects of these factors and take them into consideration when deploying the aircraft.

a. Environment. Line of sight must exist between the designator and the target and between the target and the laser seeker (Copperhead, Hellfire, or LST). The laser will not penetrate foliage or terrain. Visibility degradation lessens or blocks the amount of energy the target reflects and the amount of energy the laser seeker receives. Laser energy transmissions are affected by scattering; absorption; reflections caused by aerosols, smoke, haze, and clouds; and by blockage caused by explosive debris.

(1) Smoke. Smoke can cause the most serious laser degradation on the battlefield. When targets are being engaged on the battlefield, the munition explosion must not hinder the engagement of subsequent targets. The designating crew must select targets that do not block other targets. The standard procedure of engaging targets that are closest to the aircraft and working backward may have to be modified. In addition to smoke that is created in the normal course of battle, smoke screens can be used which render laser designators partially or totally ineffective. Smoke can block the laser energy from reaching the target, or it can obscure the seeker on the munitions to the point that reflected laser energy on the target cannot be seen.

(2) Clouds. Clouds can affect the battlefield in much the same way as smoke. Clouds block the reflected laser energy on the target from the seeker on the munition that is being fired. Both the Copperhead and Hellfire have different minimum classified cloud-ceiling height employment limitations at various ranges. Range is a factor in determining minimum ceiling height; the shorter the range, the lower the minimum ceiling restriction. Therefore, at certain cloud-ceiling heights, crews will be restricted to firing LOAL at reduced ranges. The Hellfire missile has a ceiling height restriction only when it is fired in the LOAL mode. This restriction is placed on the Hellfire because it climbs to achieve an optimum dive angle on the target. If it is fired in the LOAL-DIRECT mode, the Hellfire will not enter the clouds. This mode allows the missile to fly virtually straight to the target with only a slight climb. The Hellfire missile can also be kept out of the clouds if lasing is delayed until laser energy is required. This mode of fire keeps the Hellfire at a preprogrammed altitude as it searches for the target. Before the munition locates the spot and as the range between the target and the seeker decreases, the amount of climb decreases. The missile pitches up only when the munition "sees" the spot.

(3) Dust, water vapor, and other particles. Dust, water vapor, and other particles in the air may weaken the laser beam so that there is insufficient energy for LST lock-on or laser munition guidance. In addition, laser energy reflected by these particles could present a false target to the tracker or the munition.

NOTE: As a rule of thumb, an attempt should be made to locate the target with day TV before designating through an obscurant. If the target can be located with day TV, designation can be achieved. If not, an attempt should be made to acquire the target in the TIS. If the target can be acquired in the TIS, the range to the target is determined. If by crew estimation (based on experience) the range reading is correct, designation may be attempted. Designation will not be attempted if these rules cannot be applied.

b. Types of Targets. Targets on the battlefield are classified into two groups--area targets and point targets. Each of these is explained in the paragraphs that follow.

(1) Area targets include infantry formations, assembly areas, motor pools, and other targets that are large in size or surface area. Normally,

area targets are neutralized by numerous observed fires delivered throughout the target area. Area targets may be designated for CAS missions using the laser spot for marking targets or engaging point targets within that particular area target.

(2) Point targets include tanks, BMPs, ZSU-23-4s, and bunkers. Point targets will comprise a large percentage of targets on the battlefield. Some of these targets can move quickly, which increases their chance of survival. Laser designators are designed to designate these types of targets for destruction.

c. Target Reflectivity. Certain materials reflect laser energy better than others. For example, the reflection from a laser wavelength of olive drab metal is 2 to 30 percent; concrete is 10 to 15 percent; brick is 55 to 90 percent; vegetation is 30 to 70 percent. Higher reflectance targets increase the probability that a laser seeker will pick up the laser spot. Certain paints being developed absorb a good percentage of the laser energy. However, because most laser guidance systems must acquire only a fraction of the laser energy being transmitted by the designator, absorption may not pose a problem. Due to reflectance restrictions, targets should be designated so that the laser beam is reflected up and in the direction of the munitions seeker.

d. Designator Beam Characteristics. Range, size, shape, reflectance characteristics, location, and motion of a target help the laser operator determine his choice of employment technique.

(1) The distance of the target from the laser determines the size of the laser spot. In an OH-58D, the size of the spot will always be smaller than the size of the target. The designator operator should designate the top center of the target and select an aiming point on the target that will optimize spot tracking and weapon guidance. To do this, the designator operator considers the direction from which the ammunition will arrive, shape of the target, angular relationship, and reflectance of the target surface. The laser should not be aimed into an opening that holds the reflected energy because there will not be enough external reflection for weapons guidance. For example, do not laser tracks of a threat vehicle. This may hide the spot from the seeker.

(2) Spot jitter is found in all laser designator systems. The inherent instability of the designator platform causes spot jitter. In certain cases, energy spillover occurs, which may cause the ordnance to guide on the spillover and impact behind the target. As smoothly as possible, track the target on the spot where the ordnance should impact.

(3) Most often, the best surface for designation is a flat surface that is perpendicular to the incoming ordnance. If a flat surface is not available, a curved or irregular surface that faces the direction of the incoming ordnance will normally present a satisfactory aiming point.

I-4. LASER DESIGNATION TECHNIQUES

The introduction of lasers requires few tactical changes. However, the laser's unique characteristics demand increased emphasis on the designating crew's laser designation techniques. The crew must properly use battlefield terrain, cover, and concealment to best observe enemy avenues of approach and enhance designator survivability.

a. Target-Designate and Target-Locate Capabilities. Once the target has been located, lasing should be attempted at the highest magnification possible. Even if target location is needed, the designating crew should not attempt to switch the laser to the range-finding mode. The designator will still range- and target-locate in the designation mode. Exclusive use of the designation mode will preclude forgetting to place the laser back in the designator mode and unsuccessfully trying to designate a target in the range-finding mode. The target-locate capability will give 8-digit grid accuracy of the target. When an attempt is being made to target-locate a threat vehicle, ensure that the vehicle's sensors do not pick up laser energy. Doing so will cause the threat vehicle to take evasive action. Lasing close to the threat vehicle or at a point through which it will pass provides enough accuracy for target location.

b. Separation Angle. When a target is lased, the greatest reflected energy is exerted on the designator-target line. For this reason, the separation angle of the target-gun line and the designator-target line is extremely important. Different offset angles are allowed for different munitions. To ensure that ordnance constraints are met, designating crews must commit to memory offset angles for each type of munition. When a remote designator is being used for a Hellfire missile, care must be taken to ensure that the laser spot is on a section of the target that is visible to the missile. The remote designator should not be displaced more than 60 degrees in azimuth from the target-gun line (Figure I-5). There is also a safety fan for a remote designator. Therefore, for safety during remote designation, the remote designator should not be within a plus or minus 20-degree fan along the gun-target line. If munitions fall outside of the separation angle, the laser seeker on the ordnance may not sense the target.

c. Target Tracking. When activated by the operator, the laser designators on the OH-58D and AH-64 produce a narrow, invisible beam of light. Tracking the target can best be achieved with TIS or TV using the image autotracker. Once the vehicle is identified, use point track to lock on the target. Once lock-on occurs, use offset track to move the hit point of the laser on the target. The designation point should be near the top center of the target and toward the direction of the incoming munition. Because of laser-guided munition's high angles of dive, a high designation point on the target will not result in a glancing shot off the target. The high designation spot causes the shot to explode down through the target (Figure I-6). The designator-operator must be prepared to change quickly to the manual tracking mode if lock-break occurs. To prevent excessive false guidance while in the manual mode, the laser should be moved smoothly and slowly on the target.

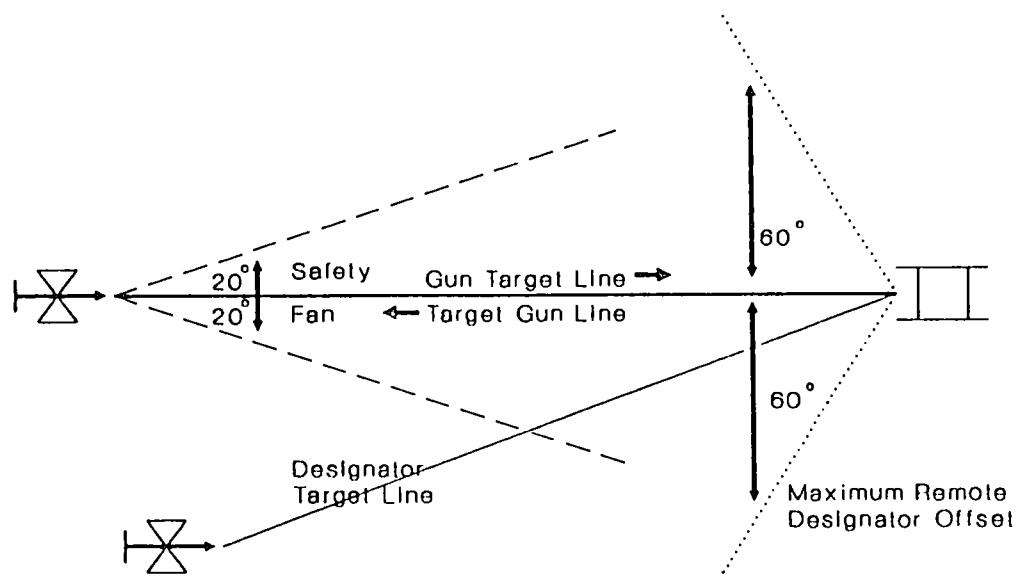


Figure I-5. Safety fan

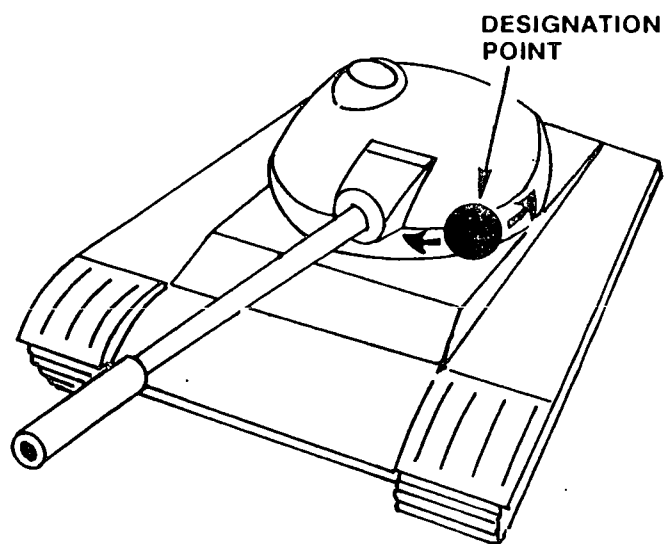


Figure I-6. Lasing the target

d. Terrain and Target Concealment. The designating crew must select point targets that will be exposed for terminal guidance at the end of the time of flight of the munition. If the laser designator-operator suspects that the target may be partially masked from the incoming seeker because of terrain or vegetation, he should aim the laser at a point on the target that will be within line of sight of the seeker; for example, a stationary tank that is partially masked by vegetation. If the target is well-concealed, the laser should be aimed at some nearby object until the target becomes exposed again; for example, a tank that is moving behind a tree or building. If the target moves out of view of the laser designator-operator and is not expected to reappear immediately, the attack may still be salvaged by moving the spot to another target in the vicinity. If the laser munition has already locked on, the spot should be moved slowly to the new location with no interruption in laser output.

e. Laser Designation Timing. The success of a laser-guided weapon depends on the laser operator's ability to lase the target for the required terminal guidance period of that particular munition. Copperhead rounds require a constant lasing period during terminal guidance at all ranges. The terminal guidance lasing period of the Hellfire missile varies at different ranges. The designating crew can lase during the entire flight of the Hellfire missile or use a delayed lasing procedure. The crew may elect to delay lasing to increase survivability or improve cloud-ceiling height restrictions on the Hellfire. If delayed lasing is used, communications are essential. The designating crew must know the time of flight of the ordnance, time at which the ordnance is fired, allowable delayed lasing time for the ordnance, and its exact range. Any delay or miscalculation may cause a missed target.

f. Offset Lasing.

(1) Offset lasing is the technique of aiming a laser designator at something near the intended target. The laser may be moved to the target for terminal guidance after laser spot acquisition by the seeker. Offset lasing improves security because on-target time and vulnerability to countermeasures is reduced. In addition, designation of an object with greater reflectivity may help acquisition, especially during target handovers.

(2) The designating crew should lase at a location to either side of the base of the target. When an offset laser spot must be moved for terminal weapons guidance, the laser must be moved smoothly to the base of the target. The laser spot is moved up to the top center of the target in time for weapons impact.

g. Lasing in Line. For offset engagements, lasing in line with the base of the target prevents the laser beam from lasing a spot at an extended distance. When the laser is moved to the target, lasing in line can prevent altering the spot to the extent that the missile cannot maneuver. Crews must use this lasing method for all target handovers to LST-equipped aircraft. Lasing in line eliminates the possibility of successful Threat countermeasures.

h. Multiple-Target Lasing.

(1) The designating and firing crews may designate multiple targets for Hellfire in the rapid fire mode. During rapid fire, the firing crew will launch the missiles that the designating crew requests at 10-second intervals. The designator acquires the targets that can be engaged successfully. The designating crew must ensure that all targets are exposed for terminal guidance for the missile time of flight. For example, for three missiles, the third target must be exposed for missile time of flight plus an additional 22 seconds between the first and third missiles.

(2) Generally, only the number of targets that can be identified as falling within the narrow field-of-view of the sensor should be engaged. The designating crew should ensure that the targets are close enough together so that the laser spot can be moved smoothly to the next target. If the targets are not close enough together, more than ten seconds should be requested between missiles in the Hellfire mission request. Because of the complexity of this task, a single designator should have no more than three missiles in flight. When energy is required on the first target, the designating crew must designate that target and continue to lase without interruption until the missile impacts.

(3) After the missile impacts on the first target, the laser designator will traverse to the base of the second target and up to the top center of the third target. Lasing base-to-base on the target prevents the laser beam from continuing beyond the target. Extending the laser beam beyond the target could alter the missile guidance to a longer range point. Engage the targets so smoke and debris do not hinder the laser spot on the next target.

i. Survivability. Survivability of the laser designator-operator can be enhanced by ensuring that laser designation times are kept to a minimum. This will reduce the time that is available for the enemy to detect, locate, and take action to suppress the designator. In conditions of probable energy counteraction of the laser designator, the crew may lase a spot in front of the target and "walk" the spot slowly to the target for the terminal portion of guidance (offset lasing). When the designator's laser is employed on the battlefield, its maximum effective range provides standoff ranges for the aircraft. The crew must ensure that only the MMS is exposed during designation. When the designator is employed incorrectly, it can become targeted by friendly munitions seekers. During laser designation, ensure that the designating aircraft does not form a dust cloud when it is at a hover. Also ensure that the foliage around the aircraft does not block any of the laser energy. The reflected laser energy off the dust or foliage may be enough to provide guidance and lock-on to your position.

I-5. DESIGNATOR UNMASKING AND MMS SEARCH PROCEDURES

OH-58D aircraft equipped with the MMS add a new dimension to the aeroscout's capability to complete its mission. The MMS allows the OH-58D to search for, locate, and engage a target without unmasking. The MMS mounted above the main rotor incorporates a day visual TV, a day/night TIS, and a laser designator-range finder. Sight displays can be seen on either one or both

cockpit display units, and a narrow or wide field-of-view may be selected in either the TV or TIS mode.

Section III

CODING, STORAGE, AND USAGE

I-6. LASER CODING

a. Coding permits the laser tracker or the ordnance seeker to be sensitive to a selected laser frequency spot. Several spots on different laser frequency codes may be within the field-of-view of the seeker, but laser frequency coding prevents the seeker from homing in on random laser frequency spots.

b. Coding is by pulse-repetition frequency. PRF is a 3-digit code. Some lasing equipment, including the equipment on the OH-58D and AH-64, has a 4-digit code capability. This 4-digit capability allows for further laser coding developments. The first code of the 4-digit system will always be set on the number one. Field artillery uses a 3-digit coding system. When receiving a message-to-observer transmission from field artillery, the number one should always be put in front of the code that is transmitted (1XXX).

c. The advantages of coding include the following:

- Coding allows an AH-64 ATKHC to make simultaneous engagements on multiple targets by using separate codes.
- Coding complicates the enemy's use of countermeasures because all designators are not on the same frequency.

d. The disadvantages of coding include the following:

- Coding increases complexity of the equipment thereby decreasing its reliability.
- The laser designator operator must know the code of the ordnance before it is engaged.
- Codes are an additional burden on command and control. When necessary, the codes must be changed and the changes issued down through command. For attack helicopter units, prior coordination is essential to ensure that supported units do not have conflicting codes.

I-7. AIRCRAFT CODING

During the mission planning stage, all laser-equipped aircraft should be given a laser code. A typical breakdown of laser codes is shown in Figure I-7.

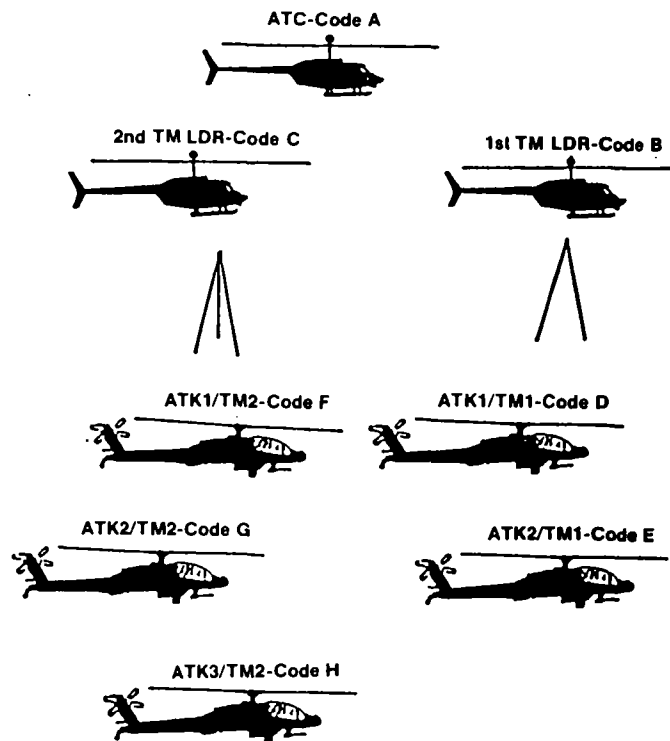


Figure I-7. Typical breakdown of laser codes

I-8. CODE STORAGE

Both the AH-64 and the OH-58D can store eight laser codes in the fire control computer. The unit SOP should delineate which codes the aircraft should store. As a minimum, the SOP should include the information shown in Figure I-8.

AIRCRAFT	CODES
ATKHC Commander:	His own code.
	Artillery codes for Copperhead (if different).
	Codes for close air support (laser-guided bombs).
	Attack helicopter codes of both platoons.
Platoon Leaders:	His own code.
	His AH-64 attack team codes.
	The other team's AH-64 codes for Copperhead (if different).
Attack Helicopters and Aero-scouts (if equipped):	His own code.
	His platoon leader's code.
	His platoon's attack helicopter codes.
	The other platoon's attack helicopter codes.
	Company commander's code.
	Artillery codes for GLLD operators.

Figure I-8. Minimum code storage considerations

I-9. HELLFIRE CODING

The Hellfire missile employed on the AH-64 and OH-58D can be set on any of the PRF codes available. The crew can select codes for the missiles and change them as necessary. For autonomous engagements, the gunner should use his own assigned code. The gunner should index the number of missiles that are encoded and at a state of readiness. (Different missions may require a different readiness state for each missile that is spooled up.) For a remote engagement, the designator will use his assigned code. Then the gunner will select that designator's code and fire the mission. As a rule, the missile will always be encoded to the assigned code of the designator aircraft. In

addition, the crew of the designating aircraft (AH-64 or OH-58D) will always use the code of the aircraft, which precludes continually having to change codes. This procedure also eliminates the possibility of having duplicate laser energy codes on the battlefield.

I-10. COPPERHEAD CODING

The Copperhead round can sense any of the PRF codes on the designator. These 3-digit codes are set on the projectile before it is fired. The code set on the projectile must match the code set on the designator. Based on the designator's identification in the call-for-fire, the FDC selects the proper PRF code and transmits it to the Copperhead round for encoding. If operations are being conducted in an area where prior code coordination has not been accomplished with the FDC, the designator aircraft code (3-digit) should be included in the call-for-fire. The FDC will verify the code to be used in the MTO transmission. If the FDC sends the designator aircraft a different code in the MTO, then the designator aircraft will immediately change to the FDC code. The code sent by the FDC will always have three digits. The aircrew must place a one in front of the code (1XXX) before entering it into the designator system.

I-11. CLOSE AIR SUPPORT CODING

Using laser designators with CAS is a fast and accurate means of marking friendly positions. It is also used to designate targets for LST and LGB. The use of lasers substantially improves first-pass target acquisition and ordnance delivery. Because the laser code of the LGB seeker is set on the ground before launch and cannot be changed by the pilot in the air, the FAC must pass the correct code to the designator aircraft. This coordination should be made before mission launch. If not, the code of the designator aircraft must be changed to the one that the FAC provided in the pilot's on-station briefing. The codes used by the Air Force are 4-digit PRF codes. LGBs require different lasing parameters. The CAS pilot inbound from the IP must announce to the designator aircraft "Laser on" and then "Laser off."

Section IV

COPPERHEAD PROCEDURES

I-12. DESCRIPTION AND CHARACTERISTICS

a. The cannon-launched guided projectile (M712 Copperhead) is a high-explosive antitank 155-millimeter projectile. The nose of the projectile houses a semiactive laser seeker, and the body contains fins and wings which deploy in flight and maneuver the round. The Copperhead round can be fired in either the ballistic or glide mode of flight.

(1) The primary mode of flight of the Copperhead is the ballistic mode. The ballistic mode is used in the minimum-to-intermediate gun-target ranges. The projectile flies on a purely ballistic trajectory similar to that of a conventional artillery round until it reaches the descending

branch of its trajectory. Then the laser designator operator is cued to begin designating the target. The Copperhead projectile acquires the reflected laser energy and initiates internal guidance and control, which allows it to maneuver to and hit the designated target.

(2) For intermediate-to-maximum ranges, the Copperhead projectile flies in the glide mode. In the glide mode, the round flies on a ballistic trajectory to a point just beyond the maximum ordinate. Using its internal gyro as an inertial reference, the projectile maintains a constant angle of fall. The projectile maintains this angle of fall until it captures the laser energy, then it maneuvers to impact on the target.

b. On the downward leg of flight, the Copperhead round acquires the laser energy reflected from the target and begins maneuvering toward it. However, the ground surface area in which the round can successfully engage the target is limited. The optimum limit of engagement of a Copperhead round is called a footprint. Footprints are in the shape of a rough oval. They form around the target location, which is sent by the designator operator.

(1) Although a round can maneuver to the outside limits of the footprint, the greatest chance of hitting a target occurs when the round is at or near the target location sent to the FDC. The greater the target location error, the lower the probability that the round will hit the target. The outer boundary of the footprint represents a 50-percent probability of hit, whereas the location sent to the FDC has a hit probability higher than 50 percent. The size and shape of footprints are affected by the type of trajectory the round flies.

(2) The position of a footprint is determined by the ballistic aimpoint, which is the point on the ground where the Copperhead round would impact if it did not maneuver. The ballistic aimpoint is on the gun-target line, which is usually short of the target location sent by the operator. The distance that the ballistic aimpoint is short of the target location varies and is called the offset correction. This distance is used to ensure that the maximum probability of hit occurs at the original target location sent by the operator. The larger the target location error, the lower the probability of hitting the target (Figure I-9).

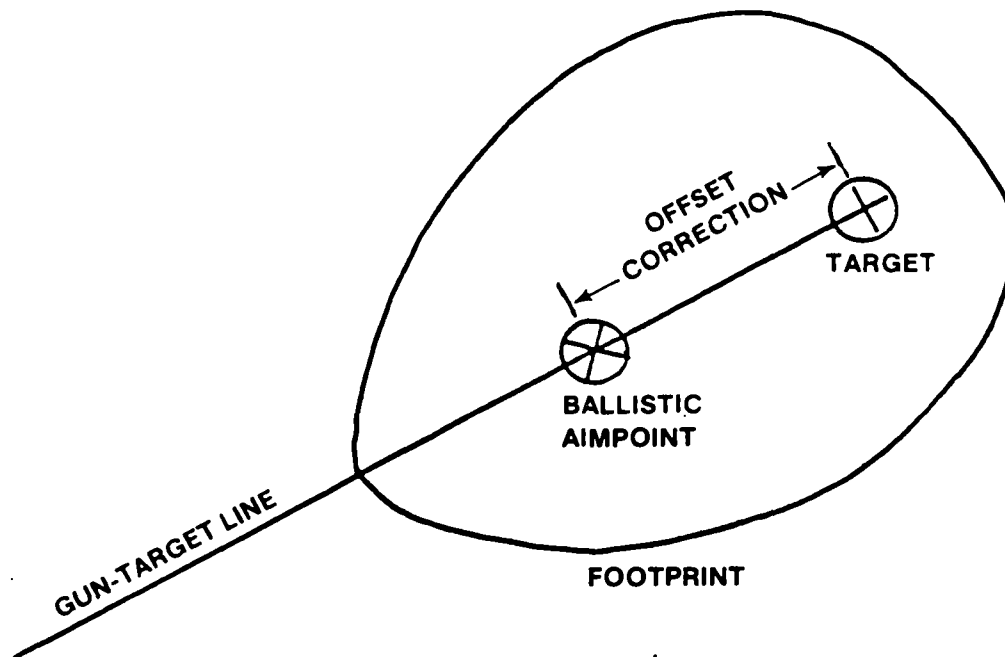


Figure I-9. Target location and probability of hit

c. To help the designator-operator visualize the Copperhead footprint, a template was produced. However, use of the template in the designator cockpit is cumbersome and awkward and is not recommended for use. The designating crew should be aware of the relative size of the majority of footprints. If the exact location of the target is given using the 8-digit target-locate capability, then the maneuver of the round will be minimal. The footprint can be used as a guide to the relative maneuver area of the round. Cloud-ceiling height information contained on the footprint cards can be transferred to kneeboard information. During periods of low ceiling heights, refer to this information after the message to the observer has been received.

d. Copperhead engagements have a maximum allowable separation angle limitation. The separation angle is the angle between the gun-target line and the designator-to-target line. The designating crew must ensure that it is designating within the separation angle by using one of two means. First, if the ATHS is used to transmit the call-for-fire, then the separation angle is automatically calculated and displayed on the MFD. Second, if the crew knows the location of the battery, it can use a map to determine the separation angle. If the designator is outside the separation angle, the crew must maneuver the aircraft laterally to stay within Copperhead constraints.

e. The success of a Copperhead mission depends on system responsiveness and the effectiveness of the communications link between the designator-operator and the FDC. The shorter the time between target detection and round on the target, the more accurately the designating crew can estimate target position relative to an intercept point. Responsive fire missions also increase the operator's ability to plan the mission so that the target will be visible during the guided portion of the round's flight. The operator must continuously designate the target during the last 13 seconds of the Copperhead trajectory. If the target is not designated continuously during this time, then the chances of hitting the target will be reduced. A few seconds' delay or a lost radio transmission may cause a miss.

I-13. FIRE PLANNING

a. Priority Targets. Priority target data is precomputed and laid on the guns when another mission is not being fired. The Copperhead round should impact approximately 30 seconds plus time of flight after the call-for-fire has been received and when "At my command" has not been specified. No more than three planned priority Copperhead targets are assigned a 6-gun battery. In an 8-gun battery, each firing platoon can be assigned a maximum of two targets.

b. On-Call Targets. On-call targets are processed the same as priority targets, except the guns are not laid-on firing data until after receipt of the mission. Normally, an on-call target can be processed in less than two minutes.

I-14. TARGETS OF OPPORTUNITY

Requesting Copperhead fire against stationary targets of opportunity is a simple matter. The designating crew simply determines the target's location and sends the call-for-fire. Requesting Copperhead against a moving target is more complex. The operator must predict where the target will be when the round arrives. This location is called an intercept point and is determined as described below.

a. After acquiring the target, the operator follows it until he is sure of the direction in which it is moving. As the target moves from point A to point B, the operator needs to determine the speed of the target.

(1) The operator can estimate the speed of the target as slow, 3 meters per second (7 mph); medium, 5 meters per second (11 mph); and fast, 8 meters per second (18 mph).

(2) The operator can also use the laser to measure the distance the target moves during a certain time interval. As the target moves, the operator lases and target-locates to obtain grid locations. Using the two locations, he determines how far the target has moved. To obtain the grid location, the operator divides by the time interval between those locations. Using the two locations, he determines how far the target has moved. The operator then divides by the time interval between those locations to

determine the target's speed in meters per second and the direction in which the target is moving.

b. Once speed and direction are determined, the operator predicts an intercept point by adding the call-for-fire transmission time, firing battery mission processing time, and approximate time of flight. Then he multiplies the sum by the target speed. If, through experience, the designating crew member knows how long it will take the firing unit to process the mission, he should use that time. If not, he should use 200 seconds as the time from the initiation of the call-for-fire to round impact. He converts this time to distance in meters and applies the distance in the direction of movement to determine an intercept point. The operator then lases that point to determine target location to 8-digit accuracy. The intercept point is used as the target location in the call-for-fire. An example using 200 seconds is as follows: slow, 3 meters per second (600 meters); medium, 5 meters per second (1,000 meters); and fast, 8 meters per second (1,600 meters).

I-15. CALL-FOR-FIRE

a. Format. When planned target locations are not available, the designator crew engages the target as a target of opportunity. Calls-for-fire for Copperhead targets of opportunity follow the same format as the standard call-for-fire. Figure I-10 shows an example of a call-for-fire format. If prior coordination of codes has not been accomplished with the FDC, then the laser code of the operator should be added in the method-of-engagement element (Copperhead, one round, Code 123).

ELEMENT	EXAMPLE
Observer identification:	"Y5A57, this is Y5A71."
Warning order:	"Fire for effect. Over."
Location of target:	"Grid 12345678. Over."
Target description:	"One tank."
Method of engagement:	"Copperhead, one round, at my command. Over."

Figure I-10. Example of a call-for-fire format

b. Message to Observer. After the FDC receives the call-for-fire and mission processing is started, an MTO is sent as soon as possible. This applies to all Copperhead targets except priority targets. MTOs are sent before firing. The MTO for a Copperhead mission includes elements as shown in Figure I-11. The designating crew must ensure that the code sent back in the MTO is the one set on the designator. If not, the code should be changed immediately to match the one sent in the MTO. (The number one should be placed in front of the code [1XXX] given in the MTO before the code is placed in the aircraft computer.)

ELEMENT	EXAMPLE
Unit firing:	A3Q27
Number of rounds:	Three rounds
Laser PRF code:	Code 241
Time of flight:	Time of flight 25

Figure I-11. MTO elements for a Copperhead mission

I-16. ENGAGEMENT COMMANDS

a. Shot. As soon as the first Copperhead round is fired in a mission, the designator receives "Shot" from the FDC. If the designator specified "At my command" or omitted the method of control in the call-for-fire (battery fires when ready), he receives "Shot" only once. Subsequent rounds will be fired without notification at intervals of at least 20 seconds. If the designating crew specified "By round at my command," the designator receives "Shot" for each round fired.

b. Designate. The next and most critical engagement command is "Designate." The designating crew members will begin designating the target when they receive the command "Designate" from the FDC. This command is sent 20 seconds before impact. If the time of flight is 20 seconds or less, "Shot" and "Designate" are sent in the same transmission.

(1) The operator must designate the target during the last 13 seconds of time of flight. Once the operator receives "Shot," he should begin his own countdown using the time of flight received in the message to observer. If for some reason he has not received a "Designate" message, the operator should begin designation when 13 seconds are left in his countdown. (ATHS will automatically count down from the "Shot" call.)

(2) If the battery is firing the Copperhead rounds automatically at 20-second intervals, the command "Designate" is sent only for the first round fired. The operator continues designating for the subsequent rounds while he moves the laser spot to the next target. If "Shot" is given for each round or the firing interval is greater than 20 seconds, "Designate" is given for each round.

c. Designate Now. If a designating crew fails to acknowledge the "Designate" command, the command "Designate now" is sent by the FDC until the designator acknowledges or the time of flight of the round elapses. If the designator-operator fails to acknowledge the "Designate now" command, "Shot" and "Designate" are sent on the next round fired regardless of the method of control.

d. Rounds Complete. After engagement commands for the last rounds are transmitted and acknowledged, the FDC acknowledges "Rounds complete." If the designating crew wants to terminate firing before the last round is fired and the FDC is controlling the firing of subsequent rounds, the FDC sends "Check firing. Cancel check firing. End of mission."

e. Requests for Additional Rounds. If additional rounds are required to engage the target array, the designating crew may request them after the last Copperhead is fired by sending " ____ rounds. Repeat. Over."



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Appendix J

KIOWA WARRIOR EMPLOYMENT

The OH-58D Kiowa Warrior is a true scout helicopter; its mission is armed reconnaissance. This aircraft has been operating effectively in the Persian Gulf for several years. Its capabilities have been tested and proven in hostile environments and in training at the combat training centers. The experiences of armed and unarmed Warrior aircrews show without question that this is the world's finest scout helicopter for night operations. This appendix is a compilation of the lessons learned and the tactics, techniques, and procedures used by Kiowa Warrior units.

Section I

SYSTEM OVERVIEW, CREW INTERFACE AND SYSTEM CAPABILITIES AND LIMITATIONS, AND OPERATIONAL EMPLOYMENT CONSIDERATIONS

J-1. SYSTEM OVERVIEW

a. Purpose. Built in response to a short-notice hostile situation, the Warrior represents state-of-the-art components. Its application across the operational continuum is unlimited. In the field today, the Warrior participates in a multitude of missions such as intelligence, field artillery aerial observation, armed reconnaissance, and target designation for attack helicopters and CAS aircraft.

b. Features. The Warrior is a multipurpose light helicopter; its similarity to the OH-58A/C ends with the airframe. The Warrior features an integrated "glass" cockpit with two multifunction displays and a four-bladed rotor system driven by an improved engine and transmission. It has a mast-mounted sight for day and night target acquisition and an inertial navigation system with doppler interface. The aircraft has a complement of air-to-air and air-to-ground weapon systems and an external cargo capability and can perform troop transport and MEDEVAC. The Warrior can be carried in C-130, C-17, C-141, and C-5 aircraft and can be mission capable approximately ten minutes after being unloaded. An unarmed version of the Warrior is fielded in target acquisition and reconnaissance companies and dedicated to field artillery employment. These unarmed aircraft will be retrofitted to the armed configuration and redistributed to the reconnaissance squadrons. The unarmed aircraft does not have the multipurpose kits used on the armed Warrior. Warrior features are highlighted in Figure J-1. A description of the system follows.

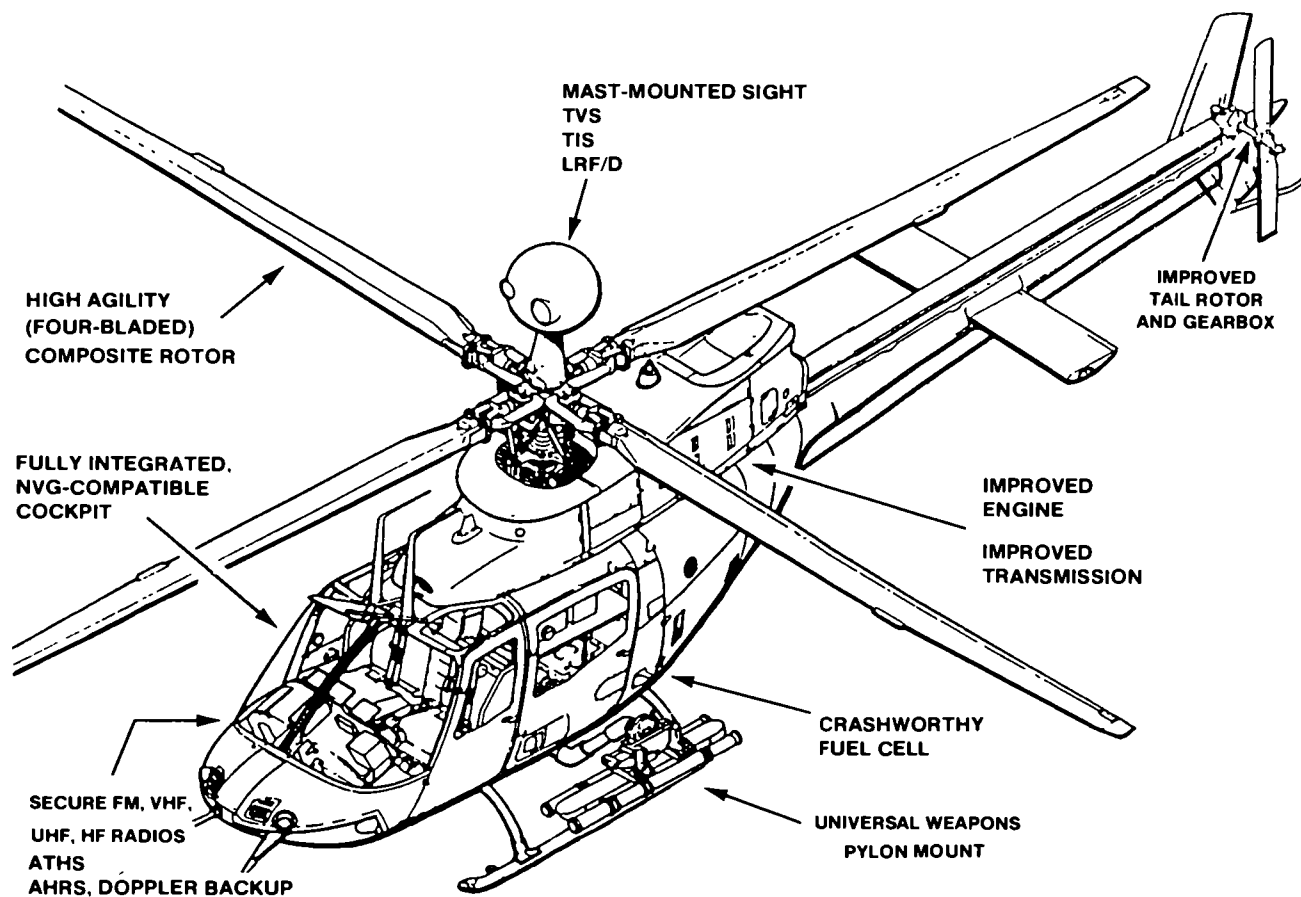


Figure J-1. Kiowa Warrior features

(1) General description.

- Crew--2 pilots.
- Height--12 feet 10.6 inches.
- Length--41 feet 2.4 inches.
- Rotor diameter--35 feet.
- Maximum gross weight--4,500 pounds (unarmed); 5,500 pounds (armed).
- Maximum airspeed--125 KIAS.
- Cruise airspeed--80 KIAS.
- Endurance--2 hours.
- Cargo hook capacity--2,000 pounds.*

*Equipment installed on the armed Warrior only.

- Litter capacity--4 (externally).*
- Troop-carrying capacity--6 (externally).*
- Data transfer system--ground station, data transfer module, data transfer receptacle in the aircraft.*
- Video tape recorder--records up to 2 hours of copilot's MFD.*
- ANVIS display symbology system--provides basic flight information.*

(2) Mast-mounted sight.

- Thermal imaging sensor.
- Television sensor.
- Laser range finder/designator.
- Optical boresight system.

(3) Weapons.

- .50-caliber heavy machine gun.*
- 70-millimeter folding fin aerial rocket.*
- Air-to-air Stinger missile.*
- Hellfire modular missile system.*

(4) Communication equipment.

- Two VHF-FM AN/ARC-186 or AN/ARC-201 SINCGARS.
- One UHF AN/ARC-164 Have Quick.
- One VHF-AM AN/ARC-186.
- Two TSEC/KY-58.
- HF capable (radio not installed).
- TSEC/KY-75 (device not installed).
- Retransmission capabilities.
- FM homing (AN/ARC-186 only).
- Airborne target handover system (digital communications).

(5) Navigation equipment.

- Attitude and heading reference system (Litton LR-80 Inertial).
- AN/ASN-137 doppler.
- AN/ASN-43 directional gyro.

(6) Aircraft survivability equipment.

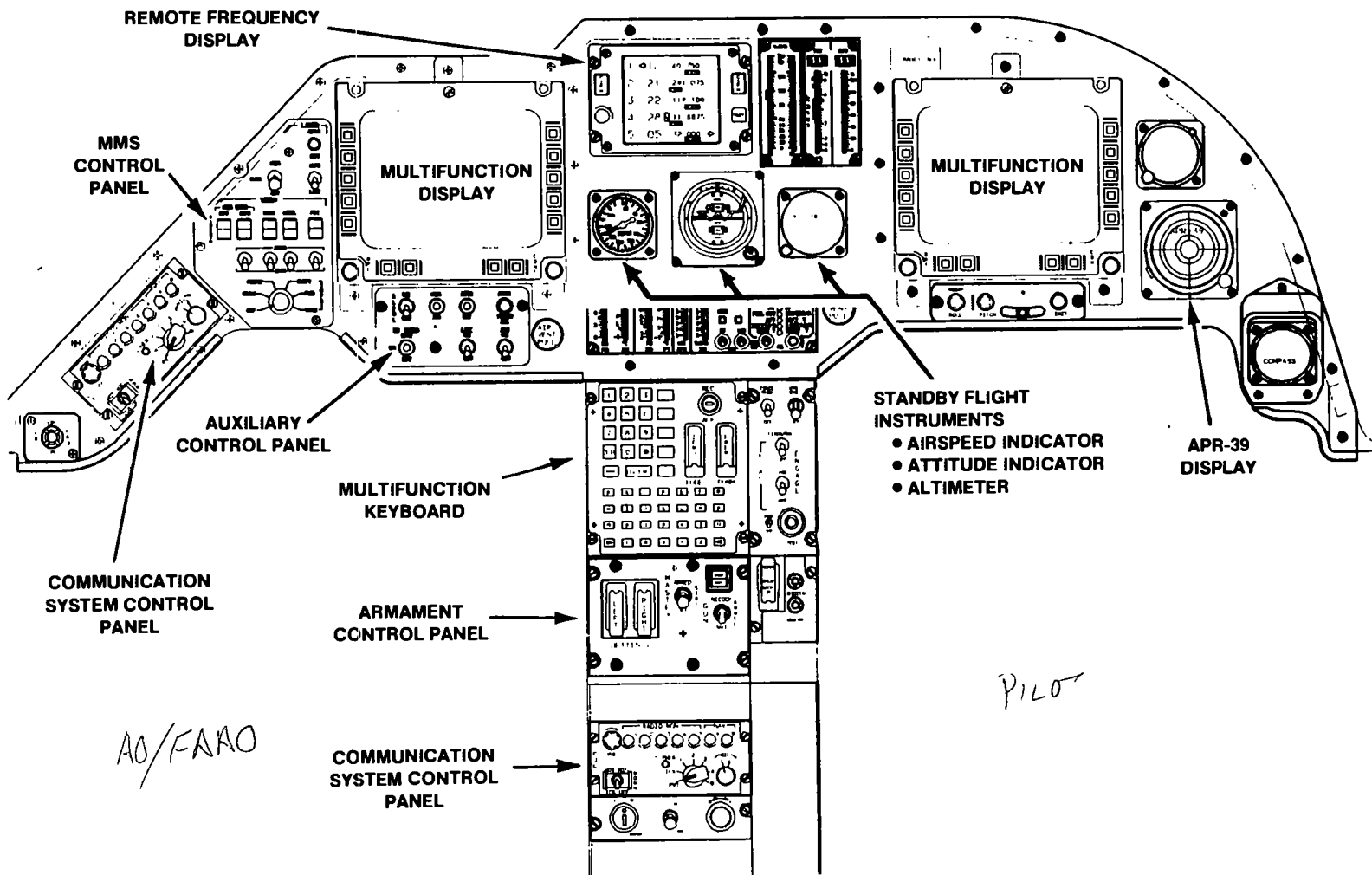
- AN/APX-100 IFF.
- AN/ALQ-144 IR jammer.*
- AN/APR-39A radar warning receiver.
- AN/APR-44(V)3 radar warning receiver.*
- AN/AVR-2 laser detecting set.*

J-2. CREW INTERFACE AND SYSTEM CAPABILITIES AND LIMITATIONS

The Warrior crew interfaces with a fully integrated glass cockpit as shown in Figure J-2. Master controller processor units correlate individual system information before displaying it on the multifunction displays. The crew can select various displays, referred to as pages, on the multifunction displays. (See Figure J-3 for examples.) The primary pages available are vertical situation, horizontal situation, mast-mounted sight, communications, airborne target handover system, and weapons. The system also has a series of pages known as built-in test and fault detection and location for maintenance purposes. Using 10 line-address keys (5 keys on each side of the multifunction display), the crew can manipulate displayed information or access subpages. Administrative flights require only one pilot. However, tactical employment requires two pilots because the mast-mounted sight and airborne target handover system can be operated from the left seat only. Except for the airborne target handover system, the pilot can access any of the multifunction display modes without removing his hands from the controls. Using various switches on his collective control head and cyclic, the pilot can also select the desired radio and preset frequency and choose the left or right weapons pylon and the level of ANVIS display symbology system declutter. The left seater does not have this capability. Warrior pilots fly the aircraft using AN/AVS-6 night vision devices.

a. Data Transfer System. The DTS consists of a ground station, data transfer module, and data transfer receptacle in the aircraft. Before a flight, the ground station can load up to three separate sets of mission data. During the flight, the operator can store data in the data transfer module. After the flight, the ground station can retrieve the data. Data include mission identification, way points, flight plans, radio frequencies, and IFF.

Figure J-2. Warrior instrument panel



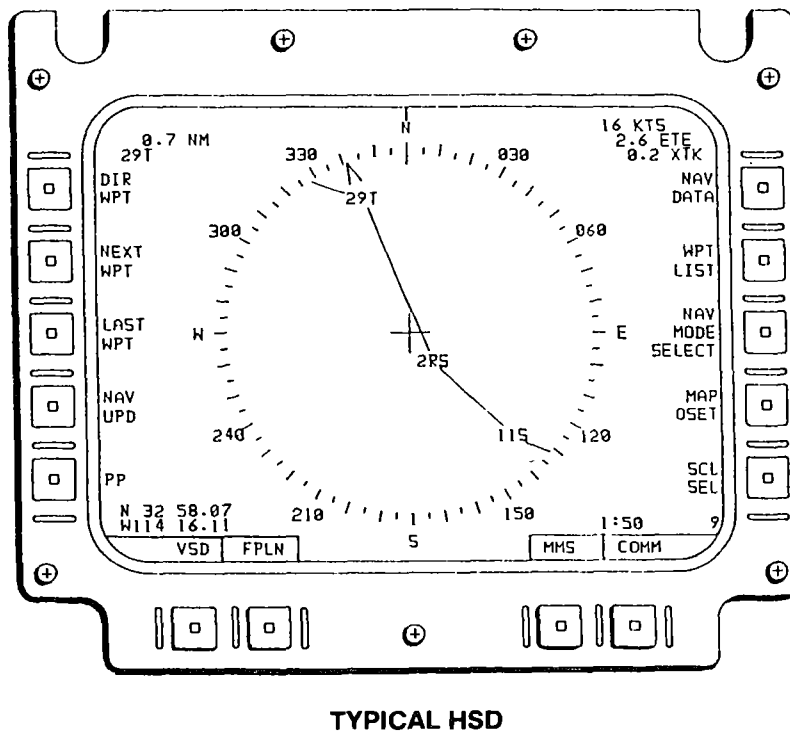
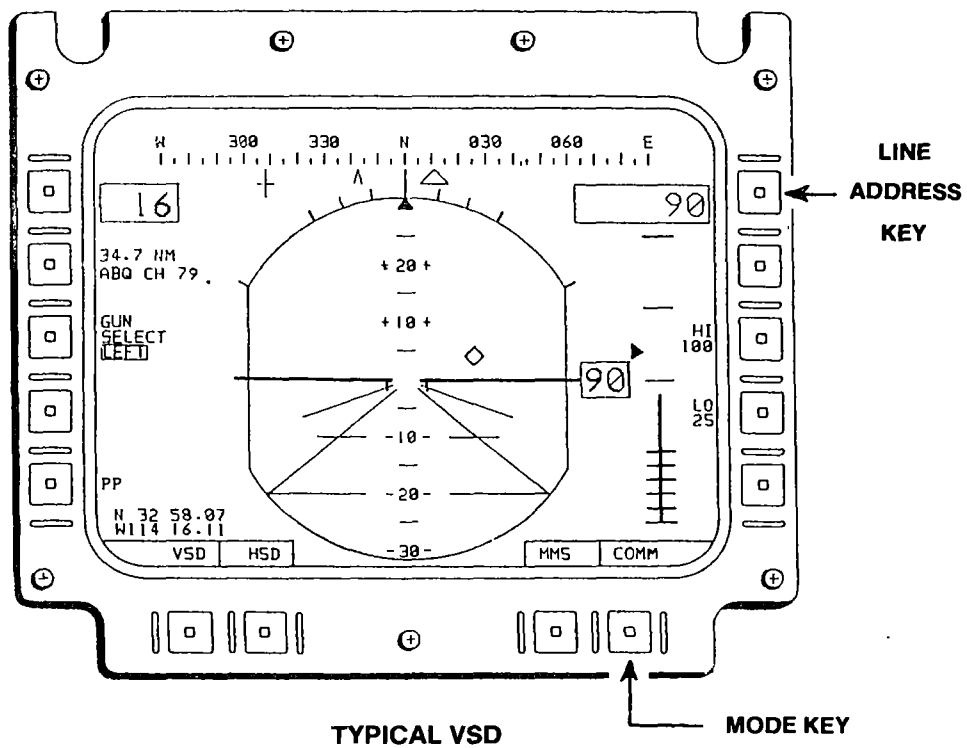


Figure J-3. Sample multifunction display pages

b. Video Tape Recorder. The VTR is not integral to the mast-mounted sight, but its main function is to record mast-mounted sight video. The VTR is an 8-millimeter system and will record whichever page is selected on the left multifunction display. It records for two hours. The crew can review the video recording in the cockpit. On completion of the mission, intelligence personnel can use the video recording for a detailed analysis. This VTR is extremely useful in reconnaissance and security operations. It is also a useful training aid for mission debriefings.

c. ANVIS Display Symbology System. The ADSS consists of drive electronics and a small, lightweight optical display assembly. The ODA mounts directly to the AN/AVS-6 NVD. The ADSS provides basic flight information to include vertical situation, airspeed, barometric and radar altitudes, heading, torque, mast-mounted sight orientation, and way point direction. The ADSS also has hover and hover bob-up modes.

d. Mast-Mounted Sight. The MMS is used only for targeting, not for flying the aircraft. Sensor ports of the MMS are approximately 6 feet above the pilot's eyes. This allows the crew to view an area while keeping the aircraft masked. The MMS can slew 190 degrees in azimuth, right or left, and 30 degrees in elevation, up or down, at a rate of 45 degrees per second. The MMS houses the thermal imaging sensor, television sensor, laser range finder/designator, and optical boresight assembly. The MMS has five operating modes and three tracking modes. Camouflage, ambient weather, and the type of terrain are major factors that affect MMS range capabilities. The following is a list of terms that are used to discuss MMS ranges:

- Detect--a target of military interest.
- Classify--tracked, wheeled, fixed-wing, rotary-wing.
- Recognize--tank, APC, bulldozer, ADA.
- Identify--T-80, M1A1.

NOTE: Some MMS system specification ranges are classified. This document provides examples to educate the reader on MMS employment. The ranges given should in no way be construed as actual specification ranges.

(1) Operating modes.

(a) Preflight. The preflight mode is used to prepare the system for flight.

(b) Prepoint. In this mode, the MMS will automatically point to a preselected position or target whose coordinates have been entered in the way point list.

(c) Forward. When this mode is selected, the MMS points straight ahead at zero degrees azimuth and elevation.

(d) Search. In the search mode, the sight will automatically repeat various scanning patterns as selected by the operator.

(e) Stow. In this mode, MMS data are stored in nonvolatile memory before the MMS is shut off.

(2) Tracking modes.

(a) Manual track. The MMS line of sight is controlled manually by the LOS control switch on the left cyclic. The crew can select the manual track mode at any time.

(b) Area track. In the area tracking mode, the MMS remains directed to the designated area regardless of helicopter movement. This mode is normally used when an area of interest is detected during flight.

(c) Point track. In this mode, the MMS locks onto a target selected by the operator, automatically tracks the target, and keeps it centered in the multifunction display.

e. Thermal Imaging Sensor. Like a FLIR, the TIS "sees" infrared energy (heat) and can detect radiation differences of less than 2 degrees Celsius. The 120 detectors are cooled to 90 degrees Kelvin (-190°C). A scanner mirror directs IR energy to the detectors at a rate of 30 times per second. The detector information is sent through an electronic multiplexer which combines individual detector signals with scan position information. The output is then displayed on the multifunction display as a monochromatic green picture when the mast-mounted sight TIS page is selected. Four major variables affect TIS capabilities. These variables are equipment condition, operator proficiency, temperature differential (Delta-T) of objects and terrain, and ambient conditions (weather).

(1) Contrast modes. The TIS can be viewed in two contrast modes: black-hot or white-hot. In the BH mode, thermal energy appears darker on the TIS picture. The more thermal energy being radiated, the greater the contrast in the TIS picture. For example, an aircraft would appear darker than the sky and the exhaust from the aircraft would appear darker than the aircraft. When the WH mode is selected, the polarities are reversed.

(2) Fields of view. The TIS has four fields of view: wide, wide-doubled (or 2X), narrow, and narrow-doubled. Wide FOV is 5X, wide 2X FOV is 10X, narrow FOV is 16 2/3X, and narrow 2X FOV is 37 1/3X. The 2X feature is an electronic doubling of the TIS picture; any distortion is also doubled.

(3) Frame freeze. The TIS has a frame freeze feature. When the FR FRZ button is depressed, it will freeze the TIS display at that instant. This enables crew members to unmask the MMS, freeze the TIS display, and then remask while they evaluate the TIS picture. The scene remains frozen on the multifunction display until the FR FRZ button is depressed again.

(4) TIS integration. The TIS has a TIS INTG switch which, when pressed, lays TIS frames on top of each other. This capability improves the video in low contrast conditions such as during periods of IR crossover or high humidity.

(5) Automatic low frequency gain limiting feature. When selected, the ALFGL reduces video "noise" in hot areas to give more detail. This feature is beneficial in a hot, rocky, desert-like environment or in an area where hot exhaust gases or equipment is present.

(6) TIS employment. To control the TIS picture, the operator uses various amounts of gain (detector sensitivity) and level (contrast brightness) along with the ALFGL or TIS INTG feature and the BH or WH mode. The more Delta-T between the object and its background, the better it can be seen in the TIS. Infrared crossover degrades the TIS capability. Normally, IR crossover occurs around sunrise and sunset when terrain and objects are near the same temperature. The best TIS conditions are warm vehicles and a cold, low-humidity environment. The worst conditions are vehicles parked in vegetation during a rainstorm. The TIS can see through most battlefield obscuring agents such as fog oil and weapon effects. Both IR camouflage nets and IR paint affect TIS capabilities.

(7) TIS setup lessons learned. When staging out of the same assembly area, aircrews will find that using the same area or object to adjust the TIS for each mission can be helpful. This gives the crew an indication of TIS performance under the current conditions.

(a) Grey scale adjustment. When the GREY SCALE is adjusted properly using the multifunction display BRT and CONT knobs, the background on the VSD, HSD, or COMM pages will be dark, not glowing. The aircrew must ensure that all 10 segments are displayed. If they are not, part of the spectrum will not be displayed on the TIS picture.

(b) Gain adjustment. The aircrew should select an area or object 4 to 6.5 kilometers away and add GAIN until a good contrast is achieved. A "grainy" picture close in is normal when GAIN is properly adjusted to detect targets. If the operator adjusts GAIN while viewing an area close in, objects farther away will not be seen in the TIS. The farther away an object is, the higher the GAIN setting must be to detect it.

(c) Level adjustment. After the initial TIS setup, one technique for target detection is to adjust the LEVEL down for WH (up for BH) three to five seconds and increase the GAIN two to three seconds for increased contrast.

(d) WH versus BH use. Generally, WH is used for a cool background and warm objects and BH for a warm background and cool objects. At night over land, WH is normally preferred because it keeps down glare in the cockpit and targets seem to stand out more. During the day, BH is normally preferred, especially in the desert.

(8) TIS operational experience.

(a) Army Aerial Scout Test. During the Army Aerial Scout Test at Hunter-Liggett, California, crews could recognize an ADA system with rotating radar next to a tank at 6.5 kilometers and detect moving vehicles at distances of more than 10 kilometers. These ranges were achieved at night with cool ambient temperatures and operating vehicles. Sometimes crews were able to find tanks by following the hot tracks on the ground with the TIS.

(b) National Training Center. At the NTC, vehicles have been detected at 15 kilometers. ADA systems with rotating radars have been recognized at 7 kilometers.

(c) Operation Prime Chance. From off the coast of Virginia during the winter, the operator could distinguish a warship from a merchant vessel at 10 nautical miles. During periods of high humidity in the Persian Gulf, sometimes the operator could not make the same distinction from any farther away than 3 nautical miles.

f. Television Sensor. The TVS has 875 scan lines per frame for high resolution. In comparison, a home TV set has only 525 lines. Because the TVS picture displayed in the cockpit is monochromatic green, the crew cannot distinguish colors. The TVS is generally a day-only sensor. However, because of its low light level capabilities, the TVS can be used at night to look into areas with artificial illumination. For example, the TVS can effectively look inside a lighted aircraft hangar at night. This capability should not be confused with the light amplification capabilities of NVG. The TVS can see through light obscurants, such as haze, but not into thick smoke as with the TIS.

(1) Fields of view. The TVS has two fields of view: wide and narrow. Wide FOV is 6 1/4X, and narrow FOV is 25X.

(2) TVS operational experience.

(a) Army Aerial Scout Test. At Hunter-Liggett, stationary tanks were routinely detected at 8.5 kilometers during the daytime. On a clear day, a crew could recognize vehicles at 7 kilometers.

(b) National Training Center. In the daytime, moving vehicles have been detected from ranges in excess of 15 kilometers. Maximum recognition ranges are typically 6 to 8 kilometers.

(c) Operation Prime Chance. Crews were able to distinguish large warships from merchant vessels out to 10 nautical miles. Because of the greater size differences in surface vessels, detection and recognition ranges will vary greatly over water compared to over land.

g. Laser Range Finder/Designator. The LRF/D is a powerful neodymium-YAG laser that operates at 1.064 microns (1,064 nanometers). It has a nominal ocular hazard range of 23 kilometers at 1.064 microns. The laser performs four basic functions: ranging, navigation update, target position location, and designation.

(1) Ranging. Laser ranging can be performed out to 9.99 kilometers (software limit).

(2) Navigation update. The navigation system can be updated by lasing a known point such as a water tower.

(3) Target position location. The position of a target can be determined by lasing. The location is stored as an eight-digit UTM grid or latitudinal and longitudinal coordinates.

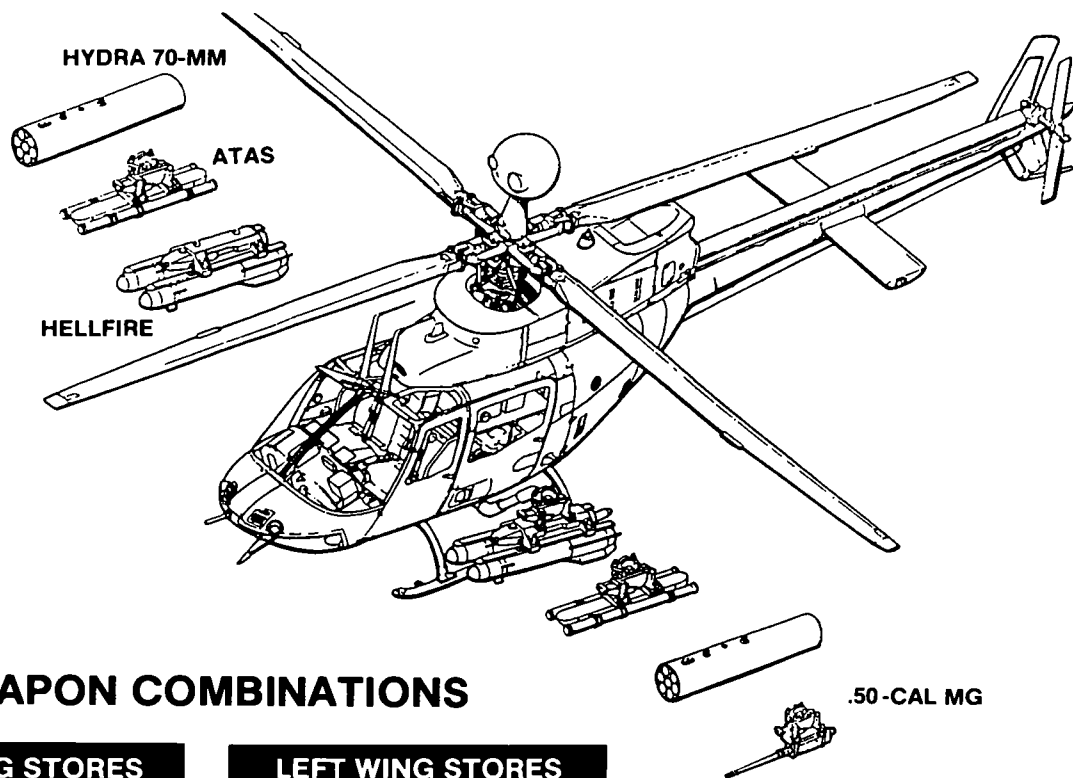
(4) Designation. Designation can be performed either for laser spot trackers or for laser-guided munitions. The crew can select any three- or four-digit laser code and can store up to eight laser codes. A vehicle or an object can be designated from as far away as it can be seen with the TVS or TIS. Warriors have designated target areas for CAS in excess of 20 kilometers. Moisture and smoke degrade laser capabilities by refracting laser energy. The laser cannot designate through most types of smoke.

h. Optical Boresight System. The OBS is used to align the TVS and TIS line of sight to the LRF/D line of sight. The operator can automatically or manually perform a boresight at any time but normally only during run-up. The OBS makes the MMS LRF/D one of the most accurate in use today.

i. Video Down Link. Some Warrior aircraft may have the capability to send real-time video to a remote station. Video down link is a proposed product improvement.

j. Weapon Configurations. The Warrior has two universal weapon pylons, one on each side. The four primary weapon systems are the .50-caliber machine gun, 70-millimeter rockets, and the Hellfire and Stinger missiles. With the integration of the MMS and weapon systems, the Warrior has superior night-fighting capabilities. For example, the Warrior crew can keep the aircraft masked, acquire a threat aircraft flying while blacked out, and track it using the MMS. The pilot can then orient his weapon on the target, unmask, and fire before the threat can detect the Warrior. Weapon mixes are extremely flexible to accommodate METT-T (Figure J-4). Commanders should develop gunnery programs that are linked to the unit's METL according to FM 25-101. Configurations include the following:

- | | | |
|---------------------------|------------|--------------|
| • .50-caliber machine gun | 500 rounds | left pylon |
| • 70-millimeter rockets | 7-shot pod | either pylon |
| • Hellfire missiles | 2 missiles | either pylon |
| • ATAS | 2 missiles | either pylon |



WEAPON COMBINATIONS

RIGHT WING STORES	LEFT WING STORES
	
	
	
	
	
	
	
	
	

LEGEND	
	1 - .50-CALIBER MG
	2 - HELLFIRE MISSILES
	7 - 70-MM RKTS
	2 - STINGER MISSILES

Figure J-4. Warrior weapon configurations

NOTE: A standard configuration would include a .50-caliber machine gun on the left pylon and a seven-shot rocket pod on the right. With the exception of the .50-caliber machine gun, the same system can be mounted on both pylons. (If the .50-caliber machine gun were installed on the right side, it would restrict access to the fuel filler port.) For example, two Hellfire missiles could be mounted on each pylon for a total of four missiles. All weapon systems except the .50-caliber machine gun can be jettisoned.

(1) .50-caliber machine gun. The .50-caliber machine gun uses standard military linked .50-caliber ammunition. Its maximum effective range is 2,000 meters. Bullet drop at 2,000 meters is 33 feet; crews normally use the tracer burnout range of 1,600 meters as the maximum effective range. The pilot can use a gun display on his multifunction display for sighting; however, the preferred method is "heads up" for safety and tactical reasons. Some aircraft are equipped with an IR aim point laser for targeting (not the laser in the MMS). The basic load of .50-caliber ammunition is 500 rounds.

(2) 70-millimeter rockets. The Warrior can carry one or two rocket pods, for a maximum of 14 rockets. Seven-shot rocket pods have two zones; zone A has four rockets, and zone B has three rockets. This allows for warhead selection. The three primary warheads used are high-explosive rockets, flechettes, and multipurpose submunitions. The pilot can aim the rockets either through the multifunction display or heads-up. Heads-up employment is necessary for suppression engagements. The MMS operator must help set up multipurpose submunition shots because of mandatory ranging requirements.

(a) High-explosive rockets. HE rockets are area fire warheads. They have programmable fuzes that can point-detonate or be set to detonate between 700 and 8,800 meters.

(b) Flechettes. Flechettes also have programmable fuzes that can be set to detonate between 700 and 8,800 meters. They can be used for air-to-air combat or as a suppression and an antipersonnel round.

(c) Multipurpose submunitions. The MPSM has nine bomblets in the warhead and operates on the "Wall in Space" concept. The crew ranges the target area and then fires the MPSMs above it. The MPSM warhead deploys the bomblets at the laser range distance, allowing them to fall into the target area. The dual-purpose bomblets are effective against lightly armored vehicles and unprotected personnel.

(3) Air-to-air Stingers. The Warrior can carry two ATAS missiles on either pylon, for a maximum of four missiles. The ATAS has a minimum arming range of less than 1,000 meters and a maximum range in excess of 5 kilometers. The pilot can lock onto a target with either the pilot display unit, which is a heads-up sight, or through the multifunction ATAS display.

(4) Hellfire missiles. The Hellfire is a laser-guided, point-detonating, 100-pound missile. The Warrior can carry two of these missiles on each pylon, for a maximum of four missiles. The crew guides the missile using the MMS. The minimum engagement range is 500 meters, and the maximum range is 8,000 meters, depending on launch modes. The missile can be employed either autonomously or by a remote designator. The seeker head can acquire the laser spot in either the lock-on before launch or the lock-on after launch mode. For remote designations, operators can use a maximum offset angle of plus or minus 60 degrees from launch azimuth, with a minimum separation angle of plus or minus 20 degrees from launcher to designator.

(5) Copperhead artillery projectiles. The Warrior is the best system for employing the Copperhead because of the MMS and the maneuverability advantages of the helicopter. It can perform a digital call for fire to the artillery battery computer system and laser-designate for the Copperhead. Copperhead ranges are 3 to 16.1 kilometers from the gun tube. The Warrior crew can designate moving or stationary targets out to 10 kilometers. Designation ranges depend on the type of target, ambient conditions, and MMS performance. The maximum separation angle from the gun-target line is 45 degrees.

k. Communications. The Warrior has two FM radios, one UHF radio, and one VHF radio. Provisions for an AN/ARC-199 HF radio with TSEC/KY-75 are in place; however, HF radios are not installed in most Warriors. The Warrior has two TSEC/KY-58s; one is dedicated to the FM 1 radio, and the other can be used for the UHF, VHF, or FM 2 radio. The crew can switch between the UHF, VHF, and FM 2 radios in the secure mode anytime during flight. The UHF is Have Quick capable.

(1) Airborne target handover system. The ATHS is a 10-pound, line-replaceable unit that transmits digital data to users via secure or unsecure existing radio links. It can communicate with artillery TACFIRE and BCS nets. It will also be compatible with the Air Force Improved Data Modem to be fielded in CAS aircraft starting in January 1992. The ATHS can maintain eight active aerial fire missions, two active and two preplanned artillery missions, six preset movement messages, and six preset free text messages. It has preformatted reports, such as SITUATION/STATUS, SPOT, ARTY, BDA, and CAS, and requests for reports. Twelve received messages can be stored for later review by the crew. Target location information from the MMS and navigation systems is automatically placed in the ATHS for target handovers and reports. An enhanced ATHS is being developed.

(2) FM homing. FM homing can be performed only when an AN/ARC-186 is used for the FM 2 radio. It cannot be performed with the AN/ARC-201 SINCGARS.

(3) Retransmission. Retransmission can be accomplished between FM or HF radios. For example, the crew can receive on FM 1 and retransmit on HF.

1. Navigation.

(1) Equipment. The Warrior has the best helicopter tactical navigation system in the world. The attitude and heading reference system is an inertial navigation system that receives input from a doppler. The information is combined by a processor which graphically displays navigation information on the horizontal situation display. The system can operate on UTM grid or latitudinal and longitudinal coordinates. On initial run-up, navigation alignment takes about six minutes. An in-flight alignment mode allows immediate takeoff with reduced accuracy until alignment occurs. Getting a navigation update every 15 minutes or 15 kilometers is desirable but not necessary. Forty way points can be stored, and a flight plan can be constructed using up to 20 way points. The flight plan is displayed on the horizontal situation display on a scale of 1:50,000 or 1:250,000. The crew can easily manipulate the information in the navigation system during flight. When the MMS system is used to locate a target, the navigation system automatically assigns the target a way point number and displays it graphically on the HSD page. The MMS can also be used to get an offset laser update for the navigation system.

(2) Navigational experience.

(a) Army Aerial Scout Test. The AAST demonstrated that this "smart" navigation system can operate on a two-hour mission and remain accurate within 100 meters at NOE flight profiles.

(b) Operation Prime Chance. Overwater operations severely degrade the accuracy of the navigation system. Crews must have several fall-backs to verify overwater AHRS performance. For example, crews can use time-distance-heading, radar vectors from ships, or the LAMPS or AWACS. Operation Prime Chance aircraft use TACAN and LORAN-C.

m. Aircraft Survivability Equipment. The Warrior has an integrated ASE suite. It includes the following:

(1) AN/APX-100. The AN/APX-100 transponder has Modes 1, 2, 3(A/C), and 4. The crew can change transponder information through the COMM page on the multifunction display.

(2) AN/ALQ-144. The AN/ALQ-144 is an IR missile jammer. It sends out an IR signal that confuses the guidance system on hostile IR-seeking missiles.

(3) AN/APR-39. The AN/APR-39 is a radar warning system. The Warrior can be equipped with either the AN/APR-39 or the AN/APR-39A. The "A" version has an improved display and expanded processing capabilities.

(4) AN/APR-44(V)3. The AN/APR-44(V)3 is used to detect continuous wave threat signals. It complements the AN/APR-39 which detects only RF pulse threats.

(5) AN/AVR-2. The AN/AVR-2 is a laser detection set. It provides a laser warning to the crew through the AN/APR-39 display. If the aircraft is being lased, the crew also receives a caution message and an audio tone.

n. Deployability. Because of its rapid deployment capability, the Warrior can be quickly integrated into armed conflict. This aircraft can be unloaded from all Air Force transport aircraft (C-130 to C-5) and operational in ten minutes. Unloading and reassembly can be done on a blacked-out dirt airstrip at night. Because the Warrior tail boom must be removed for C-130 and C-141 high-density loads, assembly time will increase. Table J-1 shows an airlift loading chart.

Table J-1. Airlift loading chart	
Rapid Deployment Load	High Density Load
C-130: 2 each	C-130: 3 each
C-141: 4 each	C-141: 6 each
C-5: 10 each	C-5: 13 each

(1) Loading. Key features of Warrior deployability are the folding main rotor blades, vertical fin, and horizontal stabilizer. For transport in the C-130 and C-141, the MMS is removed and placed on the utility hoist; armament pylons remain installed. Other key features are the kneeling landing gear and the retracted positions of the loaded rocket pod and gun (Figures J-5, J-6, and J-7).

(2) Unloading. When the Warrior reaches its destination, a crew of four (one pilot, one copilot, and two crew chiefs) reassembles and prepares the aircraft for combat. Team drills are critical; each member must know exactly what to do and when to do it. The goal is to have the helicopter airborne within ten minutes of rollout from Air Force transport aircraft.

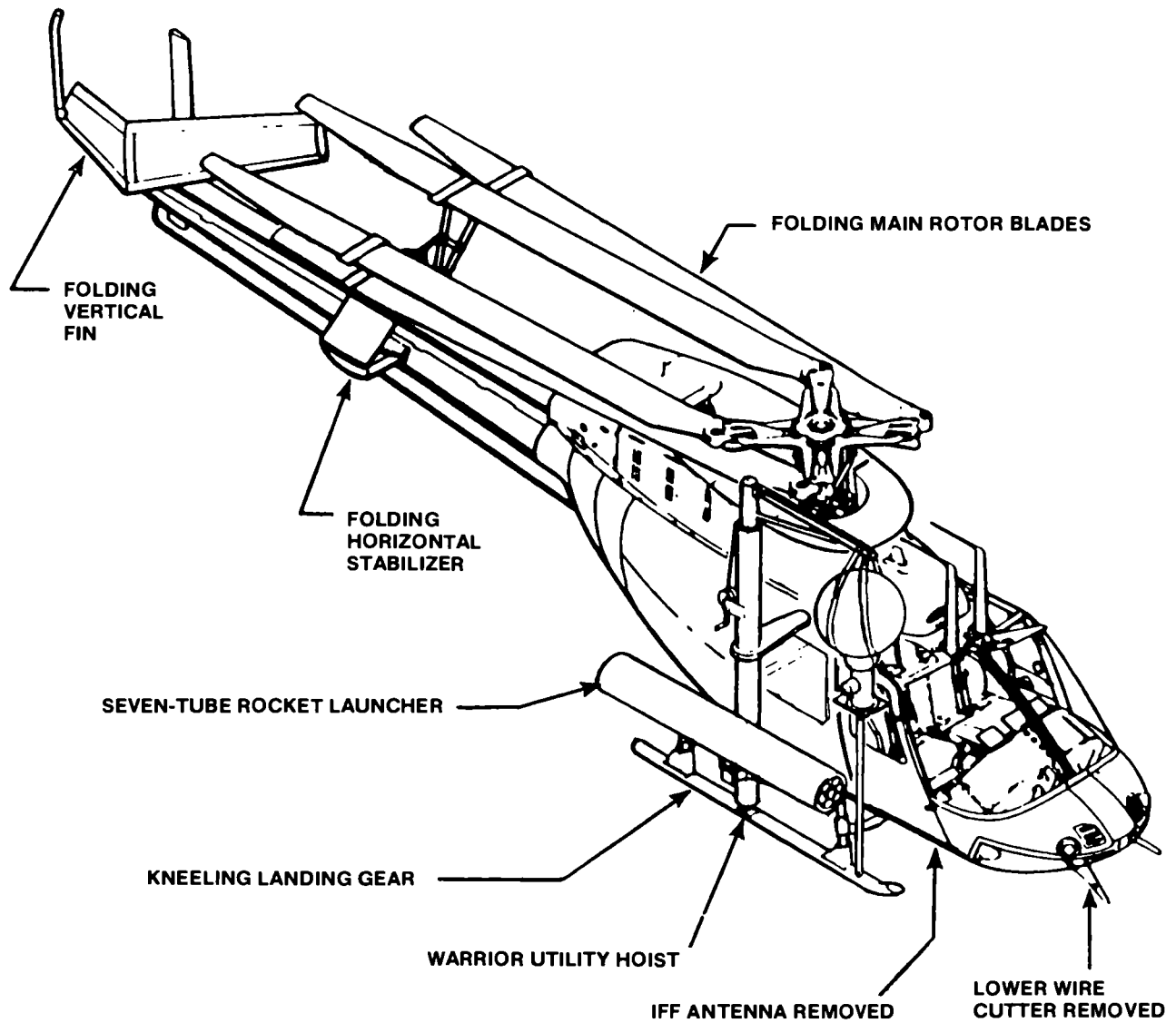
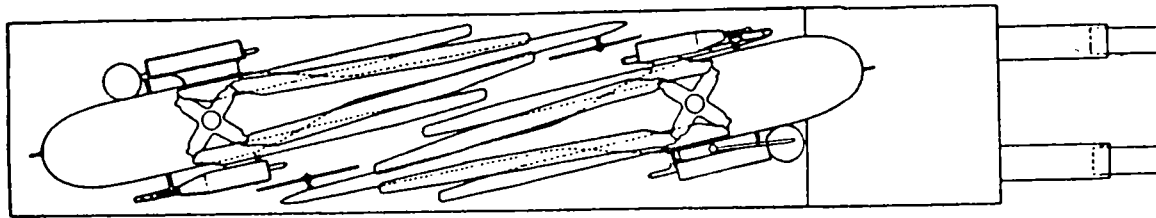
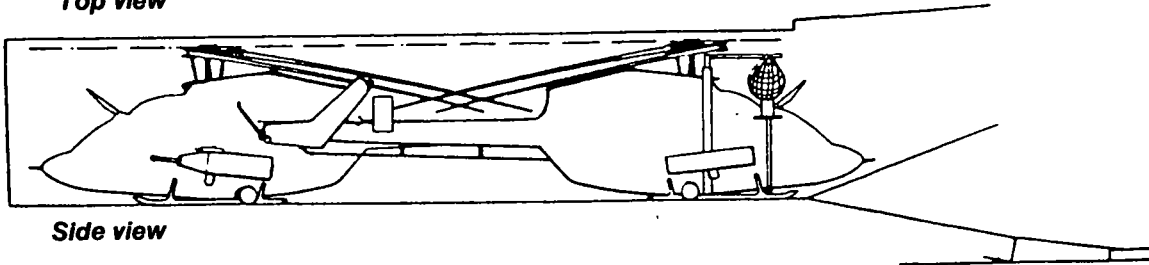


Figure J-5. Deployment load

2 FIT INTO A C-130



Top view



Side view

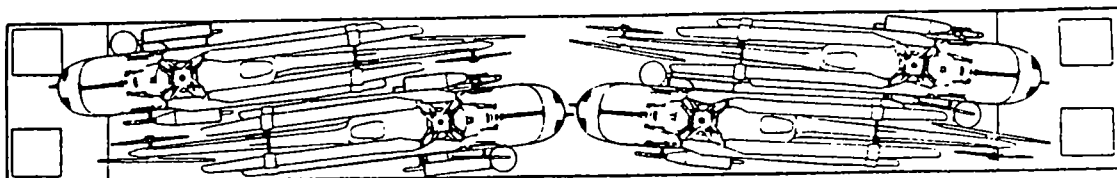
- ▶ MMS STOWED
- ▶ GEAR RETRACTED

- ▶ VERTICAL AND HORIZONTAL STABILIZERS FOLDED

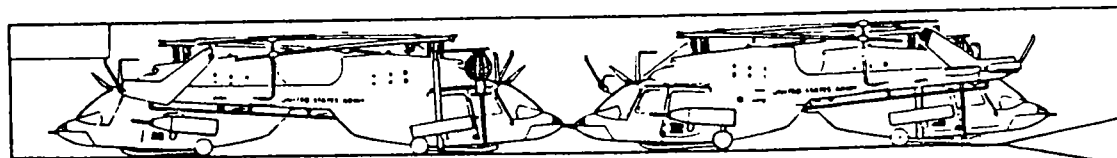
- ▶ PYLON ARMS RETRACTED
- ▶ HOIST INSTALLED

Figure J-6. C-130 RDF load

4 FIT INTO A C-141



Top view



Side view

- ▶ MMS STOWED
- ▶ GEAR RETRACTED

- ▶ VERTICAL AND HORIZONTAL STABILIZERS FOLDED

- ▶ PYLON ARMS RETRACTED
- ▶ HOIST INSTALLED

Figure J-7. C-141 RDF load

o. Configurations.

(1) Troop transport. A side-facing bench can be attached on each side of the fuselage just under the door frame. The bench begins at the aft edge of the forward door and extends to the aft fuel cell bulkhead, as shown in Figure J-8. Seat belts and tie-downs are included to allow the transport of cargo or three troops seated on each side. The platforms are completely removable to allow standard operation of the aircraft. In this configuration, the Warrior can be operated as a utility, cargo, or troop transport aircraft.

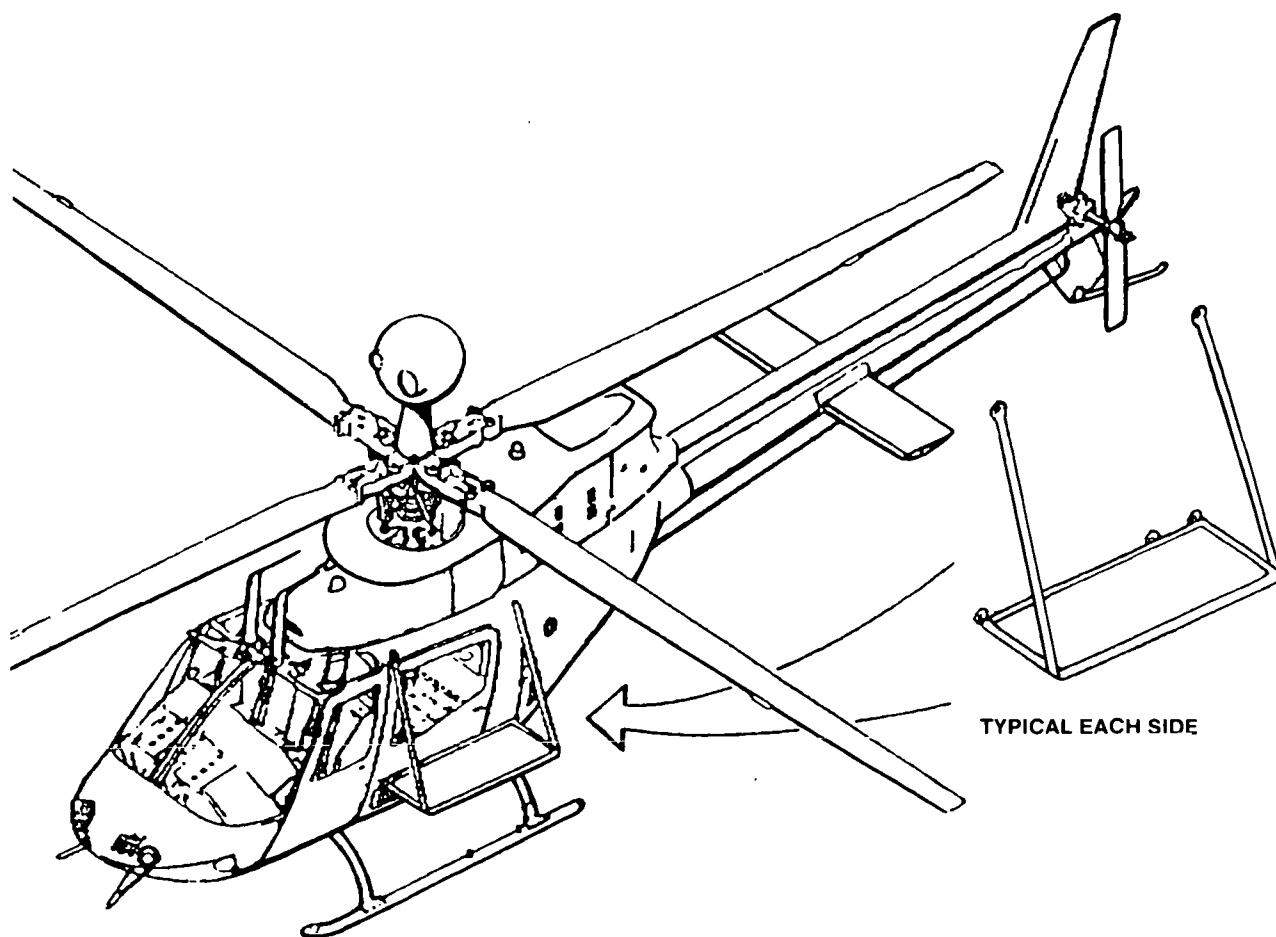


Figure J-8. Troop transport configuration

(2) Medical evacuation. With the addition of another platform just above the troop seat platform, the Warrior can be converted into a MEDEVAC aircraft (Figure J-9). Two litters can be carried on each side. In this configuration, the platforms can be used for either litters or cargo. Both Stokes metal-framed litters and standard Army canvas litters can be carried interchangeably. The external litter configuration does not allow medical personnel to attend patients during flight. Severely wounded troops who require constant medical attention should not be evacuated using the Warrior.

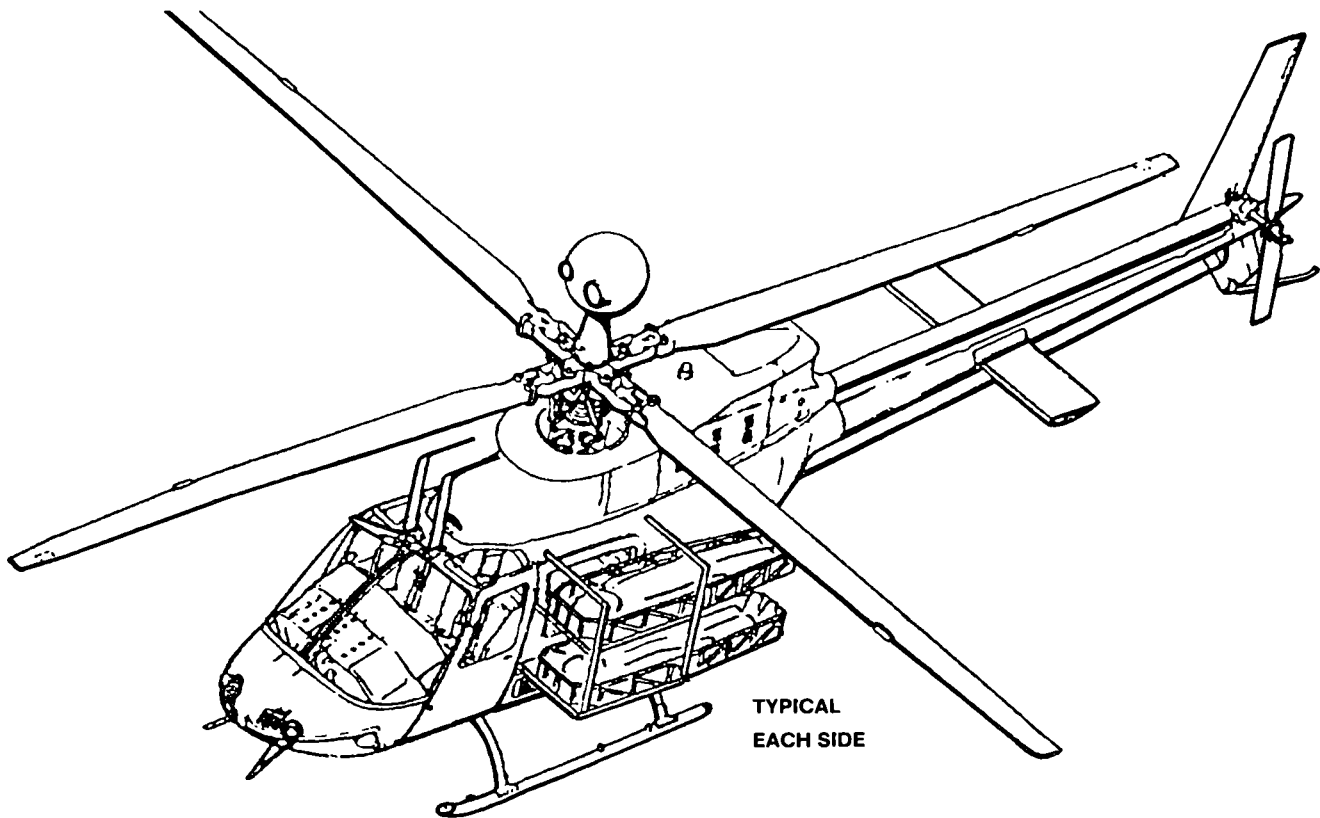


Figure J-9. MEDEVAC configuration

(3) Sling loads. The Warrior has the capability to sling load 2,000 pounds (Figure J-10). The cargo hook assembly can be quickly installed and removed to accommodate rapid deployment. The hook is held in a stowed position during operations with no load. The following examples are sling-load capacities based on a 1,610-pound load, single-pilot mission, 40-minute operation with 20 minutes of reserve fuel, and the required slings:

- .50-caliber ammunition--19 boxes (3,800 rounds), which is 7.6 aircraft loads.
- 70-millimeter 10-pound HE rockets--11 crates (44 rockets), which is 6.3 pylon loads.
- ATAS--17 crates (17 missiles), which is 8.5 pylon loads.
- Hellfire--7 crates (7 missiles), which is 3.5 pylon loads.
- JP4--192.5 gallons, which is enough to refuel two Warriors.
- FARE System 1 (without blivets).

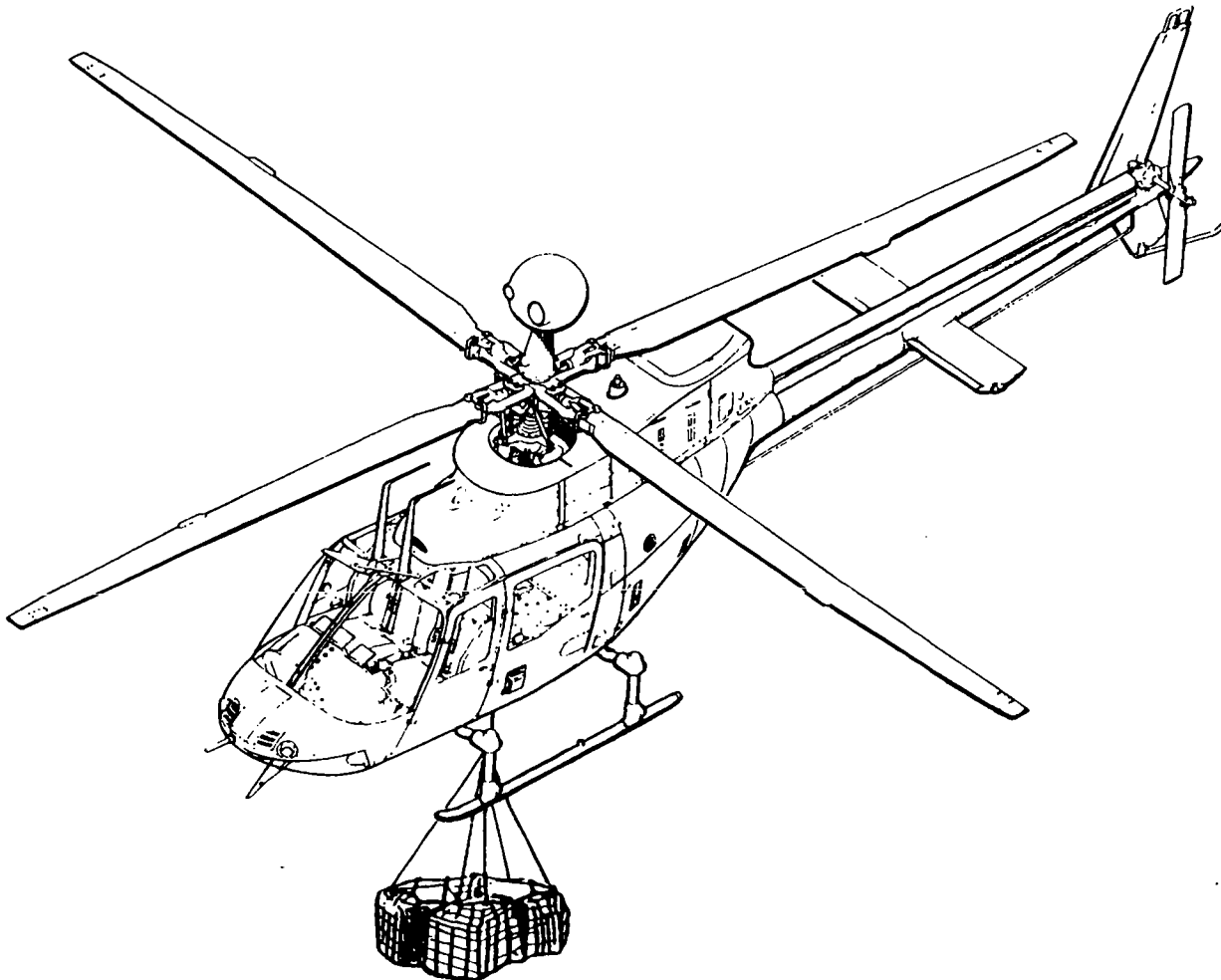


Figure J-10. Sling-load configuration

J-3. OPERATIONAL EMPLOYMENT CONSIDERATIONS

Although they are not necessarily aircraft limitations, the considerations discussed in the following paragraphs will affect the operational employment of the Warrior. To maximize the employment of their assets, commanders must formulate their estimates based on these considerations.

a. Obscurants. Some obscurants can keep the laser energy from reaching the target; they can also hide the target from the incoming munitions seeker. Dust, haze, rain, snow, and other particulate matter may limit visibility and affect sensor and weapon performance and standoff capability. Good laser return does not always indicate good designation. The laser can give intermittent ranges or multiple targets which means the laser is being reflected by more than one target.

b. Low Cloud Ceilings. Low cloud ceilings may not allow the Hellfire seeker enough time to lock onto its target or may cause it to break lock after acquisition. At long ranges, the pilot may have to consider the ceiling to allow time for the seeker to steer the weapon onto the target.

c. Hellfire Danger Zones. Warrior aircrews must make sure that they are not in the danger zone of the Hellfire missile when it is launched. The ATHS aids in Hellfire missions by transmitting laser codes, the missile time of flight, the launch platform location, and the position of the Warrior in relation to the Hellfire danger zone. If a target is handed over verbally, the crew must conduct a map reconnaissance and a visual search to avoid positioning the aircraft in the Hellfire danger zone.

d. Instrument Meteorological Conditions. The Warrior has the instrumentation for flight in instrument meteorological conditions but is not certified to do so. During Operation Prime Chance, crews often flew the aircraft under IMC. If the Warrior pilot inadvertently enters IMC, he can recover the aircraft.

e. Crew Endurance. The day and night capabilities of the Warrior exceed aircrew endurance limits; thus commanders must strictly prioritize the use of this valuable asset and monitor crew endurance closely.

f. Operator Certification. Because of the level of sophistication of the Warrior sensor suite, operators of the systems in this aircraft must be graduates of the resident Warrior transition course. They should also be certified in both the left and right seats.

g. Other Considerations.

(1) The Warrior airframe does not provide an overpressure system to protect the crew in an NBC environment.

(2) During night operations, Warrior aircrews experience all the limitations of the aviator's night vision imaging system. Flight off the MMS is not possible.

Section II

PREMISSION PLANNING

J-4. OVERVIEW

This section contains lessons learned by experienced Warrior crews from testing, training, and real-world missions. These employment techniques were tried and proven against a real enemy or an active threat. Mission planning and aircraft employment are always METT-T dependent. Aircrews must train as they will fight and base new techniques on a hostile threat, not on a sterile environment.

J-5. MISSION BRIEFING

Following the mission briefing, the PC obtains all pertinent information from the operation order while the copilot copies the maneuver graphics. The crew then compares and reviews the information. The review is important because it allows both crew members to contribute to specific mission planning.

NOTE: For ease of understanding, PC refers to the pilot occupying the right seat and flying the aircraft. Copilot refers to the person in the left seat operating the MMS and the ATHS.

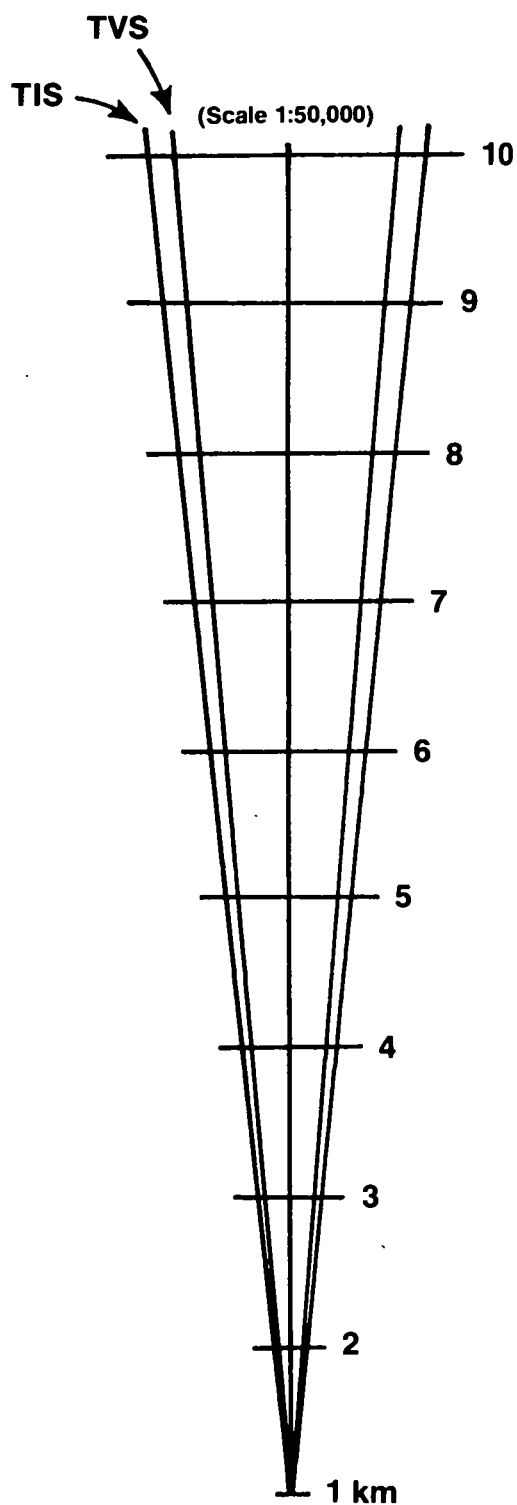
J-6. WAY POINT SELECTION

On the map, the crew selects way points for the navigation route (see navigation planning and employment below), maneuver graphics, observation posts, and prepoints for known or suspected enemy locations. At this time, way points are selected but not numbered. Crews need to be aware of a tendency to select too many WPTs. Through experience, crews will learn a proper balance in the number of WPTs to select for a mission.

J-7. OBSERVATION POST AND PREPOINT SELECTION

a. Observation Post. An aid for selecting OPs is a clear template with MMS FOV widths and ranges in kilometers for a 1:50,000 scale map, as shown in Figure J-11. With the clear template, the crew quickly conducts a map reconnaissance of possible OPs and PPTs. The crew should place the end of the template on a possible OP location on the map and then orient the centerline to the objective area. The crew checks terrain elevation and obstacle obstruction between the OP and objective area for intervisibility. OP standoff ranges of 4 to 6.5 kilometers generally give the best combination of standoff range and MMS employment. Normal considerations used in past OP selection (intervisibility, cover and concealment, elevation, background, accessibility) still apply. Selecting an OP lateral to the axis of advance, 45 degrees or more, can aid in target detection. Paragraph J-18 provides additional information on the use of observation posts.

b. Prepoint. The PPT selection is important because PPTs orient the MMS to a known point for the start of the search. Therefore, PPTs should be easy to identify. Examples are a road intersection, a bridge, or a tower. Easily identifiable PPTs can also be used for offset navigation updates and to help determine the accuracy of the MMS PPT.



MMS Planning Overlay
 (Place drawing on clear plastic.)

RANGE	TVS		TIS	
	NFOV	WFOV	NFOV	WFOV
2,000	70	279	98	332
2,500	87	349	122	415
3,000	105	419	147	497
3,500	122	489	171	580
4,000	140	559	195	663
4,500	157	628	220	746
5,000	175	698	244	829
5,500	192	768	269	912
6,000	209	838	293	995
6,500	227	908	318	1,078
7,000	244	977	342	1,161
7,500	262	1,047	367	1,244
8,000	279	1,117	381	1,326
8,500	297	1,187	415	1,409
9,000	314	1,257	440	1,492

NOTE: All distances are in meters.

Figure J-11. OP planning overlay

J-8. OPERATIONAL GRAPHICS DEPICTION

Crews should draw the operational graphics, OPs, proposed routes, and WPTs on a blank sheet of paper. This drawing aids the crew during mission planning, and the PC uses it during the flight. See the example in Figure J-12.

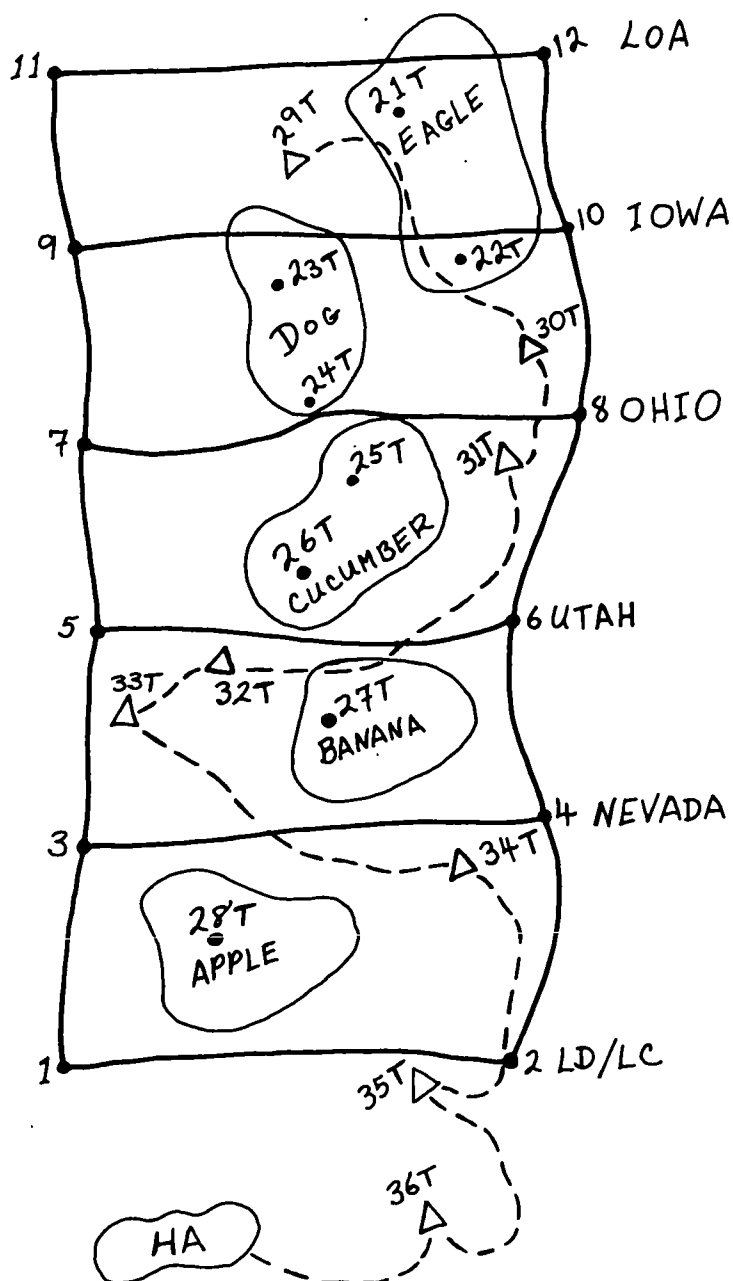


Figure J-12. Mission graphics drawing

J-9. WAY POINT NUMBERING

The crew assigns a WPT number to each point on the graphics drawing. When assigning numbers for maneuver graphics such as end points for phase lines, the crew should use 1 through 20. The numbers 21T through 40T should be used for OPs and PPTs, which will appear as floating WPTs. (Floating WPTs are those that are not in the FPLN but will appear on the HSD.) Sequential numbering of OPs and PPTs from 21T through 40T is critical. When stores 21T through 40T are filled, subsequent lasing and target storage will erase information starting at 40T and will sequentially count down through 21T. Therefore, the crew should assign the lowest target number (21T) to the PPT farthest from the start point. The closest OP would be assigned the highest target number, 40T. Figure J-12 shows how WPTs should be numbered. WPT numbers on the map and the WPT list for the HSD must be the same. Clearly, aircraft working together must have the same WPT numbers. If not, crews must communicate using only common graphics names, grid coordinates, or SOP rally terms.

J-10. FLIGHT PLANNING FOR THE HORIZONTAL SITUATION DISPLAY

The crew determines the WPT sequence needed to draw graphics on the HSD. For example, the phase lines from Figure J-12 are drawn onto the HSD; the FPLN would be 1, 2, 4, 3, 5, 6, 8, 7, 9, 10, 12, 11. The numbers 21T through 40T used for OPs and PPTs appear as floating WPTs on the HSD.

J-11. OBSERVATION POST/MISSION CARD COMPLETION

The crew fills in the OP/mission card as shown in Figure J-13. During the mission, the card is a quick reference for the copilot and helps keep the crew focused on the plan. Knowing the distance from an OP to a suspected enemy location helps the crew to determine the location of a target when it is detected. For example, the crew can see a vehicle 2 kilometers beyond the suspected location on the same azimuth as the PPT. Crew members may not realize that it is beyond the PPT and might call it in as being in the first proposed location. By knowing the distance from the OP to the PPT, the crew will recognize the difference in location immediately upon lasing.

J-12. MAP WAY POINT NUMBERING

The crew numbers the WPTs on the map to match the WPT numbers on the graphics drawing. During the mission, the PC keeps the drawing on his kneeboard and the copilot uses the map. The PC uses the drawing as a reference for comparing the terrain with the HSD and graphics names and for reviewing the proposed route between OPs. For example, a crew is at OP 34 on Figure J-12. The copilot performs a TGT LOC on a tank and stores it as 40T; 40T appears next to 26T on the HSD. Therefore, the PC knows by referencing the graphics drawing on his kneeboard that the tank is in Area CUCUMBER.

OP	PPT	RNG	DESC/ THREAT	REMARKS
36	28	4 to 6 km	Trail/mech	Trails and tree line
	27	6 to 8 km	Road int/arty	Road and tree line
35	28	1 to 4 km	Trail/mech	Trails and tree line
	27	3 to 6 km	Road int/arty	Road and tree line
34	28	1 to 4 km	Trail/mech	Trails and tree line
	27	1 to 4 km	Road int/arty	Road and tree line
	26	4 to 7 km	Road int/ADA	Road and draw

Figure J-13. OP/mission card

J-13. NAVIGATION PLANNING AND EMPLOYMENT

The navigation capability of the Warrior enables a skilled crew wearing NVG to fly over unfamiliar terrain, at low level and high speed, and stay within 100 meters of the route centerline. Three keys to en route navigation are proper WPT selection, combining the map and HSD course line, and good crew coordination. The crew may decide to have a separate FPLN for a navigation route and then load the mission FPLN upon entering the mission area.

a. NAV ALN Page Variation. On 715-series software, which is found only on the unarmed Warrior, whenever magnetic variation is added to the NAV ALN page, the VSD heading tape and HSD compass rose are adjusted. If the way point caret is followed directly, it no longer leads directly to the selected WPT. It will lead the aircraft to the WPT in an arc unless the pilot compensates for the added magnetic variation. When NEXT WPT is selected, the crew should note the position of the WPT caret and add or subtract the variation to get a direct bearing. The crew can use the HSD graphics and cross track for precise low-level and NOE navigation. The WPT caret magnetic variation shift can be demonstrated in the aircraft with the following steps:

- Select a WPT that can be easily seen and is 3 kilometers or more from a start point.
- Place a 15-degree VAR in the NAV ALN page.
- Place two WPTs in the FPLN (the start point and the one that is 3 kilometers or more).

- Fly the WPT caret, and notice that it leads the aircraft to the WPT in an arc.
- Go back to the same start point, place zero degrees in the NAV ALN VAR, fly to the WPT using the caret, and notice the aircraft flies direct.

b. Navigation Way Point Selection. The three basic types of WPTs on a navigation route are a checkpoint, a turn point, and a hazard marker. A checkpoint is a distinguishable landmark, such as a road intersection or a bridge, that can be used for NAV UPD. A turn point leads the crew around or into the desired terrain feature such as a draw, saddle, or hill. For safety, major hazards (towers or wires) should be marked along the route with a floating WPT. A good technique is to place WPTs (CPs or TPs) a few hundred meters into a draw such as WPT 37T on Figure J-14. If a WPT is placed at a draw intersection, the HSD course line may confuse the crew. The HSD course line might run up the ridge between draws and cause doubts as to which is the proper draw. By placing the WPT in the draw, the crew will turn into the proper draw to fly over the WPT. The crew should use the same method to cross a ridge by placing the WPT across the ridge several hundred meters into the desired draw. If the 20-WPT capability of the flight plan is exceeded, a floating WPT may be used (such as WPT 39T on Figure J-14) and/or the copilot can enter a new flight plan along the route.

c. Route Way Point Numbering. WPT numbering of start points, checkpoints, and reporting points should start with 1 through 20. WPT numbering of turn points should start with 40T and work down in the direction of flight. This system enables the copilot to keep the proper alphanumeric sequence. A sample of combining map and HSD course lines can be seen in Figure J-14; a map with straight lines drawn between WPTs on the map navigation route depicts the HSD course line. Drawing straight lines on the map between WPTs as they appear on the HSD is a helpful visual aid. Thus the copilot can compare the HSD to the map and terrain outside the cockpit, which ties into crew coordination.

d. Navigation Crew Coordination. The PC normally keeps his HSD on a scale of 1:50,000 and uses center or offset to keep the next WPT on the screen. The copilot uses the necessary scale to stay oriented on the route. As he crosses WPTs, the copilot selects the NEXT WPT to keep the WPT caret directional for the PC. The copilot should talk the PC through route navigation. On the map in Figure J-14, for example, the copilot would tell the PC as they approach WPT 38T from the east, "Upon crossing 38T, fly left of the course line along the road to 2A." As they approach 2A, the copilot would say, "Upon crossing 2A, turn left and follow the road to the first draw to the right; then follow that draw to 37T." This method works best for low-level, high-speed navigation. For routes where enemy contact is possible or likely, the crew must stop at various points along the route and clear ahead with the MMS. If the route is simple enough, the PC can continue to conduct a traveling overwatch while the copilot clears with the MMS.

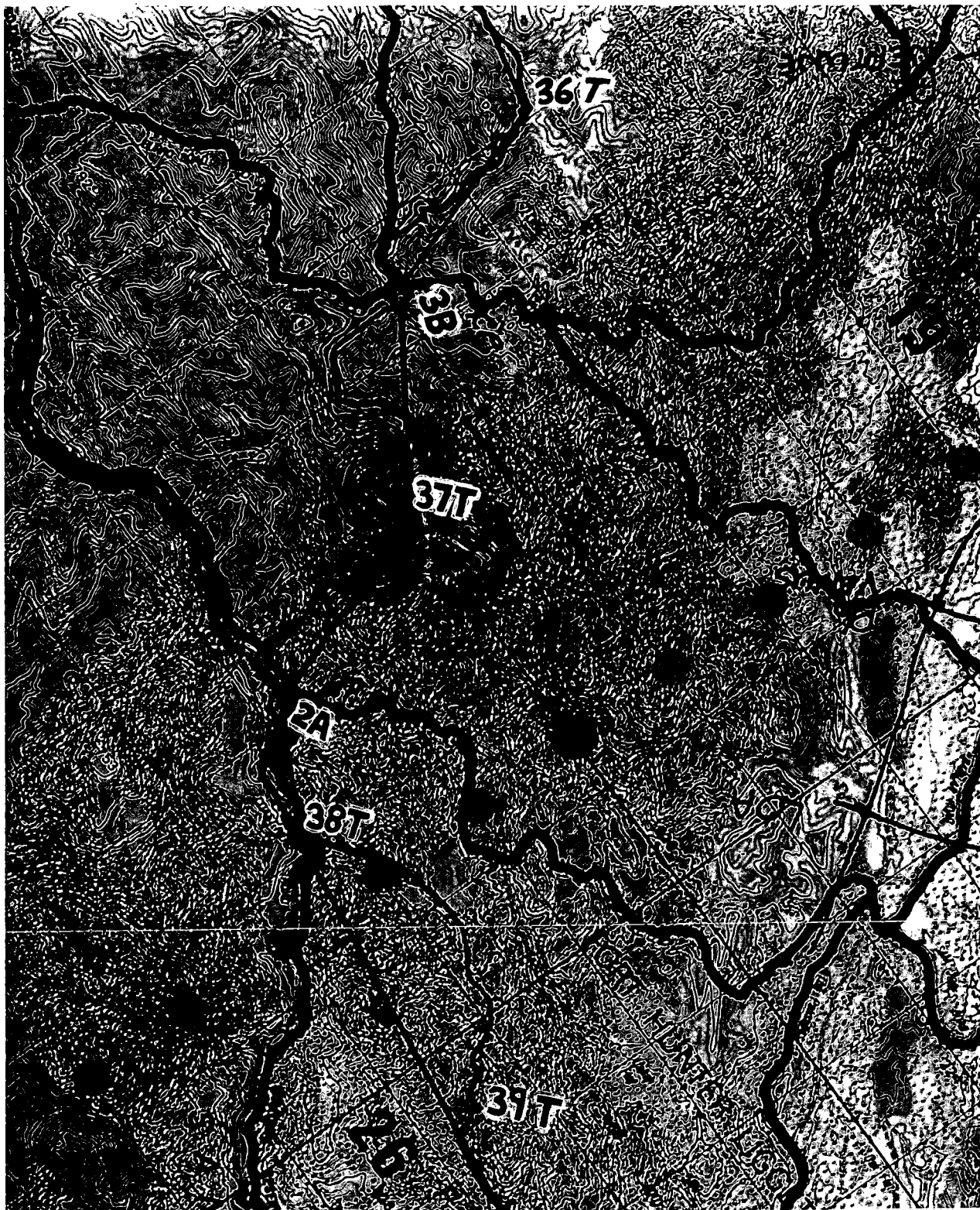


Figure J-14. Navigation route

J-14. PLANNING REVIEW

The planning review identifies planning errors and reinforces crew and team coordination. The crew should check the WPTs, FPLN, graphics drawing, map, and OP/mission card. All crew members must thoroughly understand every aspect of the mission. Pre-mission planning includes alternate courses of action and contingencies. Suspected enemy locations should be viewed from several OPs if possible. The crew must cross-monitor each other during the mission to ensure that nothing is forgotten or overlooked. Cross-monitoring should be positive communication; a good mission starts with good planning.

Section III

EMPLOYMENT

J-15. METHODS

The Warrior is most effective when employed in the armed reconnaissance role. This highly mobile weapons platform gives the commander a lethal antiarmor and antipersonnel capability 24 hours a day. It can be used to acquire and designate targets for precision-guided munitions and provide self-protection for its crew and security for other elements. The Warrior is also used to coordinate close air support and employ indirect fire support. Capable of transporting passengers to man observation posts at any time, day or night, the Warrior significantly increases the unit's HUMINT-gathering capability.

J-16. ORGANIZATION

The basic organization of a Warrior-equipped air troop and attack helicopter company is two platoons of four Warriors each, for a total of eight aircraft. Armed reconnaissance is the air troop's primary mission. The primary mission of an attack helicopter company is to destroy massed enemy mechanized forces and other forces with aerial firepower, mobility, and shock effect. Regardless of the type of unit, Warrior-equipped units must be able to perform both reconnaissance and attack missions. The commander determines the optimal weapon configuration for the unit's aircraft based on METT-T. The minimum team configuration is two aircraft. Each aircraft can provide covering fires for the other team member; therefore, scout and attack roles are interchangeable. Figures J-15 and J-16 show the organization of an air troop and an attack helicopter company equipped with the Warrior.

J-17. COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE

The Warrior's agility, ATHS, SINGARS, and Have Quick capabilities greatly enhance command and control. Modern combat forces will operate over extended distances and at various depths. The restrictions of LOS communications and enemy electronic warfare will impair the commander's ability to sustain uninterrupted communications. The ATHS helps to defeat these restrictions by broadcasting digital data in bursts over any radio. This capability, coupled with the enhanced optics of the Warrior, enables commanders to rapidly traverse and see the battlefield during the day, at night, and during periods of

limited visibility. The video tape recorder and down-link capabilities of selected Warriors afford the commander a real-time picture of battlefield activities. Therefore, the Warrior is a critical link in the coordination and execution of combined arms air and ground maneuver throughout the depth and breadth of the battlefield. Because of the versatility of Warrior units, commanders must scrutinize and prioritize all missions to preclude piecemealing this valuable C³I platform. Figure J-17 shows the Warrior communications network using the advanced communication suite.

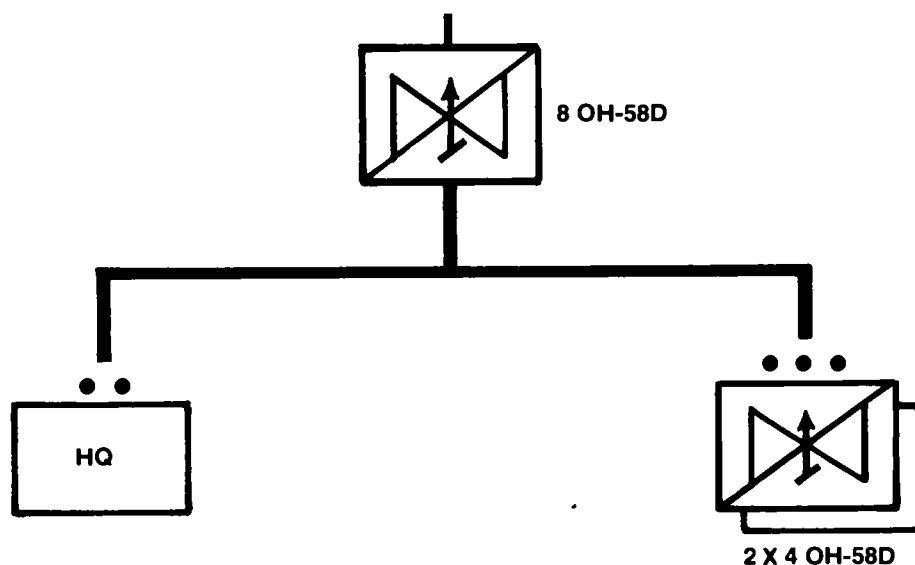


Figure E-15. Armed reconnaissance troop

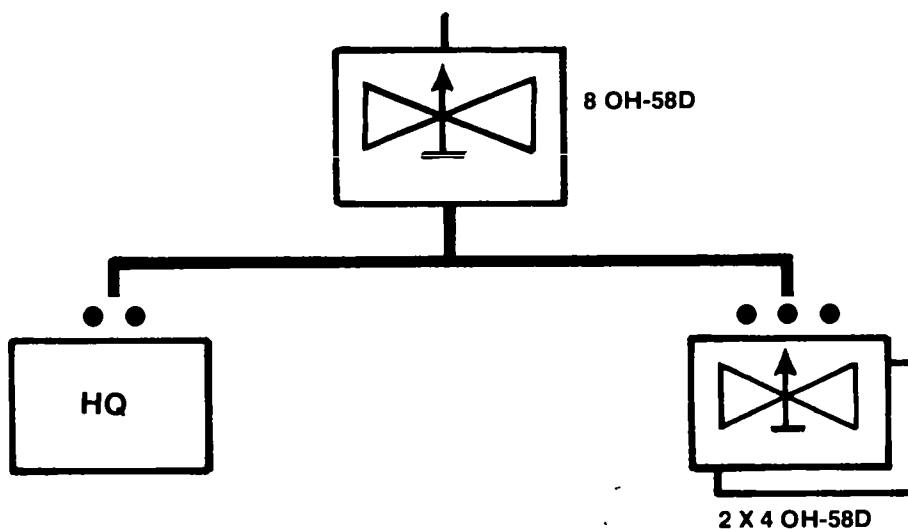


Figure J-16. Attack helicopter company equipped with the Warrior

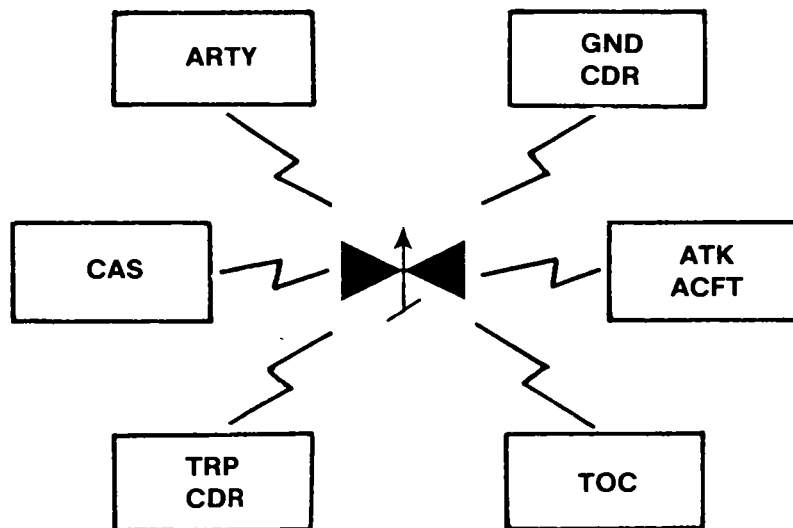


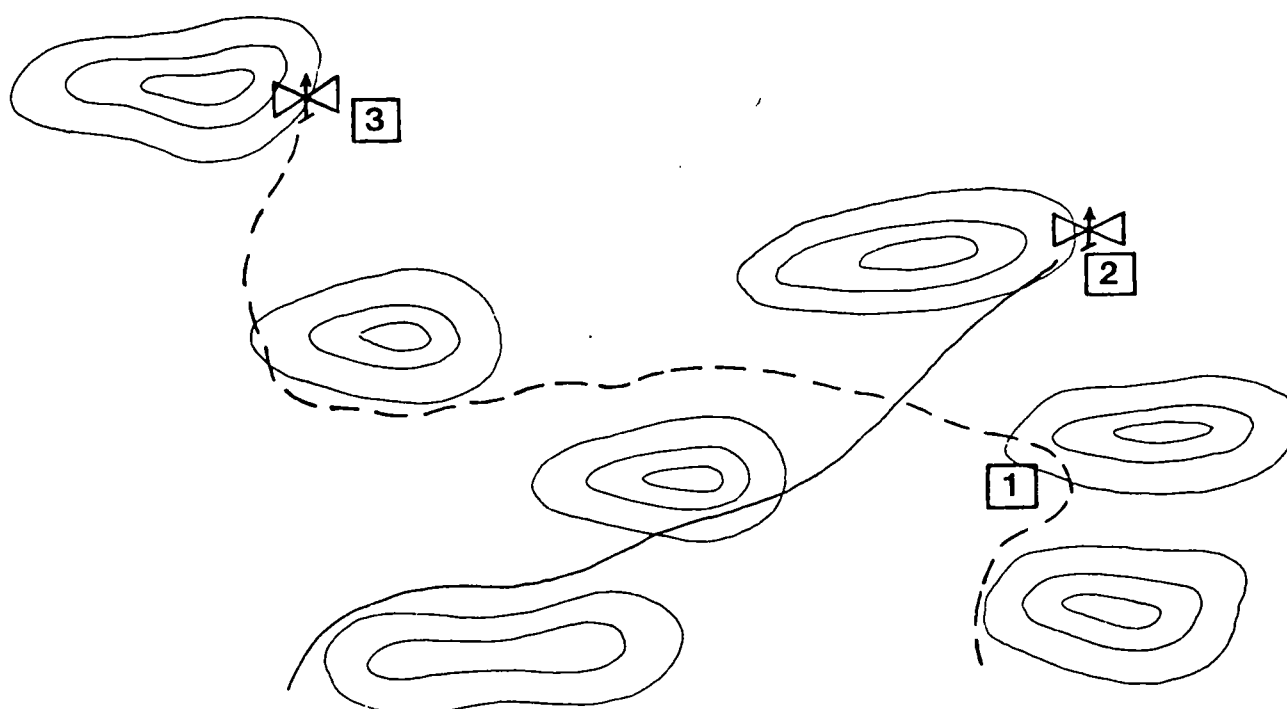
Figure J-17. Warrior communications network

J-18. MOVEMENT TECHNIQUES

Mission accomplishment in any operation requires sound movement techniques. A Warrior unit conducts traveling and traveling overwatch the same as air cavalry troops equipped with other types of aircraft; however, it conducts bounding overwatch in sequential or alternating bounds. ATHS preset messages may be used to aid in controlling movement. In other aircraft mixes, the scout aircraft primarily does the bounding and the attack aircraft does the overwatching. In Warriors, both team members bound and overwatch. Figure J-18 shows a team using the bounding overwatch movement technique.

a. Movement Between Observation Posts. The best HSD selection for maneuvering between OPs is normally a 1:50,000 scale offset. One technique for movement between OPs is to make the next OP the last WPT in the FPLN. This will produce an HSD course line to the next OP. Another technique is to use the direct way point function; however, when DIR WPT is used, maneuver graphics are not displayed on the HSD. An easy method is to reference the proposed route between OPs on the graphics drawing (Figure J-12), scan the terrain, and maneuver to the next OP. Between OPs, the copilot is often busy sending an ATHS message, setting up the MMS for the next OP, or using the MMS to clear ahead. The copilot may prepoint to the next OP to clear it en route, and the PC can use the MMS caret for navigation information.

b. Observation Post Use. Before unmasking the MMS, the crew should check the OP/mission card (Figure J-13) and make sure that the correct PPT is set.



LEGEND:

— — — AIRCRAFT NO 1

———— AIRCRAFT NO 2

□ OVERWATCH POSITION

Figure J-18. Bounding overwatch

(1) Unmasking. The pilot unmasks the aircraft at the lowest point in the OP by increasing altitude until a little blur remains in the bottom of the MMS picture. This indicates that only the MMS is unmasked. The crew should not attempt to view through branches because they create lasing problems. The copilot should be ready to target-locate or select area track while unmasking. Experience has proven that unmasking the entire aircraft and performing a visual search before using the MMS is not tactically sound. Doing so only gives away the position of the aircraft.

(2) Searching. A WFOV should always be used during the search. If targets are detected at 3.5 kilometers or less, the copilot should remain in WFOV after a TGT LOC is performed. For targets that are dug in, the best daytime detection cues are movement, unusual shapes, and silhouettes. At night, the best cues are flashes of light detected with the NVG or a thermal signature on the TIS. Crews should follow the OP/mission card as closely as possible. If they do not detect targets, they should move to the next OP without wasting time.

(a) During the day. The crew may employ the MMS at an OP in a split-screen method. Using this method, the copilot has the left MFD on TVS and the PC has the right MFD on the TIS. This setup allows the copilot to cross-check the PC's multifunction display to compare the TVS and the TIS. During a day search, the PC normally displays TIS, BH, and WFOV. The PC can assist more in a day search than at night because of peripheral vision limitations imposed by the NVG. The PC should not fixate on the TIS display but keep it in his cross-check and look for hot spots. The PC's primary responsibilities are first to control the aircraft and then to scan for immediate threats and direct the conduct of the mission. When a target is detected and the copilot does a TGT LOC, the PC should switch to HSD and check the target location. Threat forces can visually detect the Warrior easier during the day than at night. This is the major factor in daytime Warrior "kills" at the combat training centers. The PC must be more aware of exposing the aircraft to enemy line of sight and producing a rotor wash signature. In the OP, the PC must not forget his responsibility to scan for the immediate threat.

(b) At night. At night, the copilot has the left MFD on TIS. The PC should keep the right MFD on HSD to orient on maneuver graphics. When wearing NVG, the PC will not be able to assist by cross-checking the MMS display. The PC's primary responsibilities remain the same as during the day.

(3) Detection. When the copilot detects a target, he immediately determines its position by performing a TGT LOC. He then continues to search around that target for other targets. Losing a target is easy if its position is not obtained when it is initially detected. When the copilot performs TGT LOC, he must ensure that the location of the target is accurate by checking the grid on the map or by observing where the target appears on the HSD. Lateral movement in the OP can reveal targets that were blocked by trees or other obstructions.

(4) Reporting. The initial spot report may be a voice report. This quickly alerts higher headquarters and the wingman to the threat. Reporting by voice enables the copilot to continue the search. If time permits or to counter jamming, the copilot should send the report via the ATHS.

J-19. MISSIONS

The missions discussed in this paragraph are those that the Warrior significantly enhances. The basic missions of Warrior units remain the same as those of units equipped with the OH-58A/C and the AH-1. Doctrinally, these missions do not change with the use of the Warrior; however, the TTP for the missions do.

a. Armed Reconnaissance and Security. Armed and agile, Warrior units conduct reconnaissance and security operations with unprecedented effectiveness. Throughout the area of operations, the enhanced reconnaissance capabilities of Warrior units give commanders reliable intelligence that reduces the uncertainties about the terrain and the enemy situation. They also provide the commander with damage assessment information on friendly and enemy elements.

(1) Team employment considerations. When employing Warriors in teams, commanders take advantage of having aircrews that can both see and shoot. Teams must maintain defined roles throughout the mission. The lead aircraft gathers information, and the trail aircraft covers the lead. Warrior flexibility allows team members to switch roles if necessary. Weapon configurations must be considered; the wingman must have a suppression weapon, flechettes, or a .50-caliber machine gun to cover the lead aircraft. Standard breaks should be SOP. This allows the wingman to provide immediate suppression if the lead is engaged. As a rule, the lead aircraft always breaks to the opposite side of the wingman. If the wingman needs to change sides, he merely informs the lead that he is switching left or right.

(2) Video tape recorder. The VTR records everything displayed on the left multifunction display (including the MMS image) for two hours. This information can be replayed in the cockpit for review, and intelligence personnel can use the video recording for a detailed analysis.

(3) Enemy location. Suspected or known enemy locations can be loaded into the navigation system as way points; the copilot can prepoint the mast-mounted sight to those locations. The way points provide accurate position data that allow the Warrior aircrew to avoid enemy concentrations. Using the mast-mounted sight to confirm the enemy's presence, the copilot determines exact enemy grid locations with the laser range finder/designator. These locations can be stored on the way point list.

(4) Route reconnaissance. Route reconnaissance can be target-located at several different points to determine its slope, direction, and width. Some manual computation may be necessary when the crew is back on the ground. All other forms of reconnaissance may be done similarly. The route can be recorded on the VTR at key points for a review by commanders and aircrews.

(5) Screen. This mission is best described using the following example of a screen mission over rolling terrain: The troop commander is given a six-hour screen mission. Six of the troop's eight aircraft are operational. The troop commander decides to place four aircraft on the screen line; two aircraft rotate to the FARP during the entire mission, as shown in Figure J-19. The troop commander can place the four aircraft on the screen line because each aircraft can provide overwatch for the aircraft on either side.

b. Attack.

(1) Like the Apache's, the Warrior's attack mission encompasses aviation maneuvers executed during offensive and defensive operations. Small and agile, the Warrior can occupy positions inaccessible to the Apache and remain masked during target acquisition and designation. However, it lacks the Apache's capability to destroy large numbers of combat vehicles. The Warrior carries a maximum of 4 Hellfire missiles compared to the Apache which carries a maximum of 16.

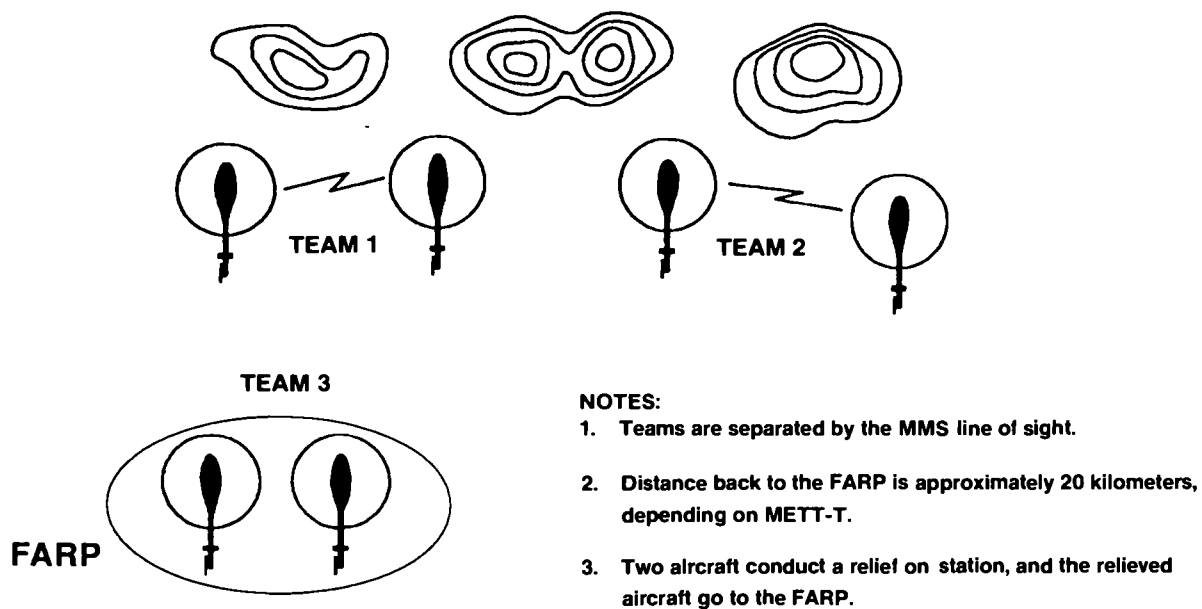


Figure J-19. Example of a screen mission

(2) Employed in advance, the Warrior enhances the survivability and effectiveness of the Apache. This employment method also eliminates problems encountered when mixing the PNVIS and NVG in the same flight and enhances the Warrior's capability to perform reconnaissance while remaining undetected.

(3) For remote LOAL Hellfire engagements, the Apache can remain masked at distances several kilometers behind the Warriors. Using only the LRF/D, the Warriors remain undetected and the Apache can employ Hellfire missiles from defilade. Experience has shown that missiles should always be coded to the designator code. The Warrior's ATHS capability improves target handovers. Crews need to consider the maximum and minimum offset angles of plus or minus 60 degrees and plus or minus 20 degrees, respectively. Smaller offset angles are more desirable.

c. JAAT Operations. JAAT operations focus combat power to destroy the enemy rapidly and enhance friendly force survivability. The target lasing capability of the Warrior, coupled with the TACAIR/CAS laser spot tracking equipment, offers greater efficiency and total integration and distribution of fires. Laser designation enables the CAS aircraft to engage targets beyond visual range. However, CAS aircrews must maneuver to acquire the laser spot. The Warrior ATHS digitally links AH-64, A-16, and fire support assets. With the ATHS, the crew can send laser spot codes, target locations, and all pertinent data with the push of a button. The unobserved Warrior enables CAS aircraft to engage targets at low level and high speed in a single pass. The Warrior brings the JAAT to the threshold of perfection for application in AirLand Battle-Future.

(1) AirLand Battle-Future. Within the context of AirLand Battle-Future, the JAAT represents a mobile, highly lethal killing force that can decisively engage enemy ground forces at extreme distances. The communication capabilities of the Warrior provide the means to rapidly coordinate and employ multiple rocket fires, CAS, and attack helicopters without achieving overkill or wasting assets. In essence, the commander can simply place a standard JAAT engagement area anywhere within the range limitations of his JAAT systems (150 kilometers) and expect to disrupt or destroy any enemy force. This "floating JAAT box" is reminiscent of the German Schwerepunkt concept--the commander identifies the place where maximum force will be applied. The JAAT allows the commander to apply the point of maximum force throughout his area of influence. The JAAT in ALB-F represents an evolutionary continuation of the original JAAT philosophy and extends that philosophy to a tremendous depth on a nonlinear battlefield. As newer deep-targeting assets are fielded and aviation acquires a true around-the-clock capability, the floating JAAT concept will reach and then surpass the killing capability of ground systems.

(2) Heliborne forward air controller. For the commander to properly coordinate and integrate CAS, the FAC must see the battlefield, communicate, and survive. The Warrior enables a FAC to acquire and designate targets, communicate, and survive in a high-intensity conflict during the day, at night, and during periods of limited visibility.

(3) Artillery and naval gunfire. With the Warrior, preprogrammed fire missions are sent digitally to supporting artillery battalions. First-round fire-for-effect is almost assured when the laser is used to locate a target; it achieves surprise and maximum destruction and limits artillery vulnerability to counterbattery fires.

(4) Communications. When CAS aircraft arrive at the IP, the H-FAC or the pilot of the lead aircraft conducts the standard JAAT briefing. To synchronize Have Quick, a Time of Day must be established. The US Army does not have the equipment to generate a worldwide TOD. It will rely on other services to insert accurate time into Have Quick radios. Primarily, time will be obtained from the tactical air control system elements such as TACPs and control and reporting centers and posts.

(5) Improved CAS tactics. Tactics validated during Operation Apache Thunder apply equally to Warrior employment. Because of the laser-designation capability of the Warrior, CAS four-ship tactics can be used. Two flights of two aircraft can attack the same or different targets. Timing is controlled by the CAS flight lead. If maximum firepower is necessary, both sections can attack simultaneously by using a second Warrior or Apache to designate for one of the flights. When four-ship tactics are used, each flight of two aircraft is given its own laser code. If the surface-to-air threat permits, the Warrior can laser-designate the target for CAS aircraft at the IP. This long-range area identification allows the lead aircraft to fly an attack course that provides the best terrain masking and to maintain contact with the target using geographical terrain features. Initial point lock-ons have been achieved beyond 20 kilometers. Far from the target area,

many ADA systems that have not been exposed may become active. These tactics significantly increase the CAS aircrews' flight situational awareness and decrease their overflight of the target while they look for a laser spot.

d. Contingency Operations. Force entry (opposed or unopposed) contingency operations characterize current and future warfare. This reality spans the spectrum of conflict around the globe. The Warrior provides the Army with unprecedented rapid deployability, force protection, and sustainment capabilities for such contingencies.

(1) Rapid deployability. The United States Armed Forces must project combat power anywhere in the world. The rapid deployment capability of the Warrior enables a commander to integrate the Warrior into armed conflict quickly.

(2) Force protection. Rapid employment of reconnaissance elements and firepower is essential to protect vulnerable combat power as it is phased into a lodgment. The Warrior can meet this challenge within ten minutes after being airlanded. With Warrior advanced avionics and optics, reconnaissance is accomplished during the day, at night, and during periods of limited visibility. The reconnaissance capabilities of the Warrior, coupled with a versatile arsenal of firepower, empower the commander to oppose any envisioned threat. Therefore, the Warrior should be the centerpiece for opposed force entries.

(3) Sustainment capabilities. During a force entry, the Warrior's multifaceted role negates the immediate need for other types of helicopters to perform reconnaissance, attack, assault, and airlift missions. Therefore, this single aircraft streamlines sustainment. Additionally, the Warrior, in its multifaceted role, allows the commander to shift aviation priorities quickly without regard to the mission design of the aircraft.

e. Raids. The capability of a Warrior unit to surgically remove a target makes it an ideal unit to conduct a raid. Typical targets that might be assigned to a Warrior attack helicopter company are C² nodes, major ammunition and POL sites, nuclear sites, and helicopter staging areas. Two aircraft can conduct a raid, particularly if the target is within artillery range. Deeper and larger targets may require a larger force.

f. Air Combat. The Warrior can be used in offensive or defensive air combat operations. Crews must quickly assess the situation in an air-to-air encounter; they must consider weapon configuration, the type of air threat, whether they have been detected by the threat, the terrain, and the distance to the threat.

(1) The ATAS is highly effective against an air threat from less than 1 kilometer up to 5 kilometers or more. If the Warrior is detected, ATAS employment will depend on threat distance and maneuverability. ATAS lock-on is hard to achieve and maintain at close ranges while maneuvering.

(2) The .50-caliber machine gun is most effective for close fights. Because the Warrior lacks speed, crews must take advantage of its small size and agility in the close-in fight.

(3) Multipurpose submunition rockets can be employed against an unsuspecting hovering threat, but the probability of kill is very low.

(4) Flechettes are very effective in air combat. However, they pose danger to friendly forces and should not be employed in friendly areas.

(5) Hellfire missiles can be used against stationary targets or targets moving at speeds up to 200 knots and at distances up to 5 kilometers. The main consideration is to keep a good laser spot on the threat. The best way to achieve a good laser spot is to lock on before launch, point-track, and use a flank shot.

g. Air Assault Security. The Warrior gives the commander the reconnaissance and firepower needed to provide security for an air assault. The air assault security force should be divided into two teams: a reconnaissance team and an overwatch team. The reconnaissance team is configured for the scout role; the overwatch team is configured for the attack role.

h. Overwater Operations. For overwater tactical operations, Warriors operate in teams of two: a lead aircraft and a trail aircraft. The lead aircraft gathers information. The trail aircraft protects the lead. Typically, the missions of the Warrior over water are to protect US shipping and provide reconnaissance for the Navy. These missions are consistent with land-based missions such as deliberate attack, hasty attack, screen, zone reconnaissance, and area reconnaissance. During these missions, the intent is to combine shipboard or Navy LAMPS MK-3 (SH-60B) radar with Warrior capabilities. Warriors can locate contacts with the mast-mounted sight or be vectored to a radar contact by a ship or Navy LAMPS MK-3 (SH-60B). (Contact is a Navy term for a vessel that has not yet been identified.)

(1) Altitudes. Overwater altitudes will depend on the threat, sea state, and illumination. With NVG, surface contrast sometimes makes flying at 30 feet and 80 KIAS easier than flying at 60 feet and 80 KIAS. Most NVG missions during Operation Prime Chance were flown at altitudes of 30 to 50 feet and 80 KIAS. Illumination variations in different quadrants can change the surface contrast level. Shallow water, known as shoal water, affects the sea state and changes the surface contrast. These factors may cause crews to climb or descend unintentionally. To maintain altitude, one technique is to set the low altitude warning system, or "low bug," 1 foot less than the 10-foot increment that the crew plans to fly. For example, if the crew plans to fly between 30 and 39 feet, it should set the low bug at 29 feet. The low altitude warning provides adequate reaction time under most circumstances.

(2) Distance estimation. Distance estimation is difficult over water. Surface vessels vary greatly in size as compared to ground vehicles.

Laser range, radar, or vertical position on the horizon is best used to determine range. At a 30- to 50-foot altitude, the distance to the horizon is 10 to 12 nautical miles; if a contact is halfway up to the horizon, it is about 5 to 6 nautical miles away.

(3) Deck landings. Shipboard and overwater operations are demanding and dangerous. Two critical aircrew tasks are taking off and landing on the deck of a ship while wearing NVG. The aircrew must be keenly aware of the deck location, obstructions, and mechanical turbulence induced by the ship's superstructure. Prevailing wind and ship course and speed significantly affect relative wind and turbulence. Visual illusions, especially relative motion, and disorientation are important factors. The lack of visual cues and height perception problems increase a pilot's chances of disorientation. The pilot flying should announce vertigo the instant that disorientation occurs so that the other pilot can take the controls. During takeoffs and landings, the crew must be alert. The pilot flying the aircraft needs to keep his vision focused outside while the copilot assists in clearing the aircraft and monitoring system instruments. Determining the rate of closure is difficult because of the lack of references, especially when landing up the stern of a single-spot deck. If a safe landing is questionable anytime during the approach, the pilot should perform a go-around.

(4) Overwater flight techniques. Echelon right is the standard overwater formation at 30 to 50 feet altitude and 80 KIAS. Between contacts or WPTs, the lead aircraft uses the MMS to scan 10 degrees right to 90 degrees left and the trail aircraft scans 10 degrees left to 90 degrees right. The trail aircraft flies slightly higher than the lead aircraft and at a distance of three or more rotor disk diameters. A separation distance of 500 meters allows the trail aircraft to provide cover for the lead aircraft en route. Flying echelon right allows the PC of the trail aircraft to fly in a position that places the lead aircraft left of the windscreen center post. This enables the PC of the trail aircraft to cross-check the system instruments with minimal head movement.

(5) Actions on contact. When investigating a contact, the team may slow down but not below 50 KIAS. If possible, crews should not approach contacts with the moon to the rear of the aircraft. This silhouettes the aircraft for the contact. The lead PC will announce the direction in which he will break off the contact so that the PC of the trail aircraft can position for a clear gun-target line. If fired upon, the lead aircraft should always break away from the GTL to allow the trail aircraft to provide immediate suppression. When breaking off a contact, the lead aircraft will announce the linkup heading and maintain 60 KIAS until the trail aircraft has formed backup echelon right.

(6) Engagement of surface vessels. Because of their speed and small size, fast attack boats are best engaged with flechettes and .50-caliber machine guns. During Operation Prime Chance, these weapons proved effective against maneuvering small boats. The Hellfire missile is the weapon of choice for precision engagements of large vessels. The Warrior crew can select offset-designate to surgically disable the vessel by striking the bridge or engineering compartment. Flechettes are used to clear the decks so

that friendly forces can board with minimum resistance. The ATAS is not effective against surface vessels because of lock-on constraints and its small warhead.

i. Drug Interdiction. Because of its stealth, sensor capability, and maneuverability, the Warrior is highly successful in the effort to combat drug traffickers. With video recording and down-link capability, Warrior crews provide the DEA with real-time, hard-copy evidence of suspected crimes.

Section IV

MULTIPURPOSE LIGHT HELICOPTER OPERATIONS

J-20. CAVALRY OPERATIONS

The Warrior can carry six combat troops. It can be used to deploy manned observation posts for the armored cavalry squadron at any time, day or night. This capability gives the armored cavalry squadron and the regiment around-the-clock, extended-range surveillance. The Warrior can also be used to extract patrols, downed pilots, or individuals from observation posts. Figure J-20 shows a Warrior-equipped air troop emplacing manned observation posts.

J-21. UTILITY OPERATIONS

The Warrior can be used to move limited supplies on the battlefield and, in turn, to conduct resupply missions. On a limited basis, Warriors can be used to move FARP's. With the external cargo hook, the Warrior can be employed in numerous utility missions; however, it is not a replacement for the UH-1, UH-60, or CH-47. The Warrior is organic to an air reconnaissance troop or an attack helicopter company and can be used for missions that are important to the success of those units. The ground commander must weigh the importance of the primary missions of those units before using the Warrior to perform utility missions. Figure J-21 shows an attack helicopter company moving a FARP while conducting a phased attack.

J-22. OTHER MISSIONS

Other missions for the Warrior may include the movement of combat soldiers during rear operations or a hasty defense. Warriors can be used to supplement these operations, but they cannot perform as well as the larger utility helicopters. Utility helicopters also provide passengers with better protection from the weather and ground fire. Passengers ride on the outside of the Warrior. A Warrior-equipped unit can conduct a raid against a lightly defended enemy by mixing the assaulting Warriors with the armed Warriors. This operation is well suited for low-intensity conflict. Figure J-22 shows a Warrior-equipped attack helicopter company conducting a raid.

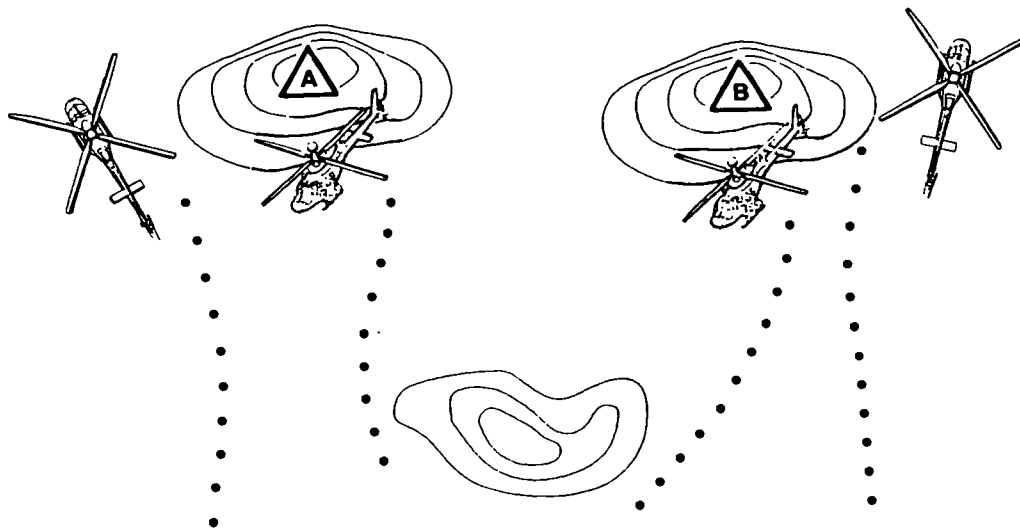


Figure J-20. Warrior-equipped air troop emplacing manned OPs

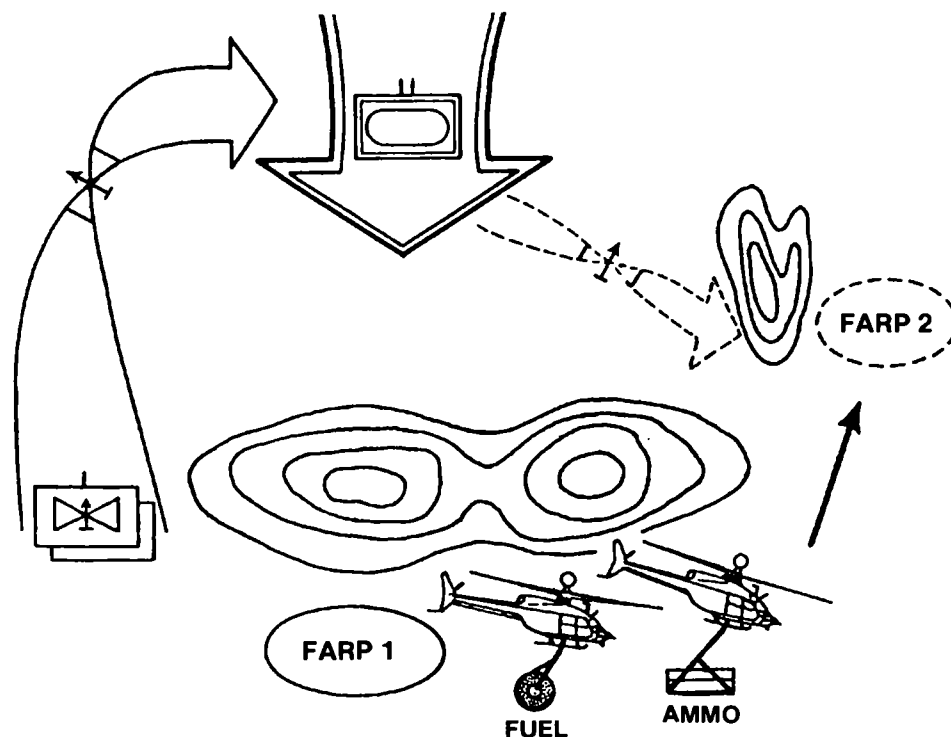


Figure J-21. Attack helicopter company moving a FARP while conducting a phased attack

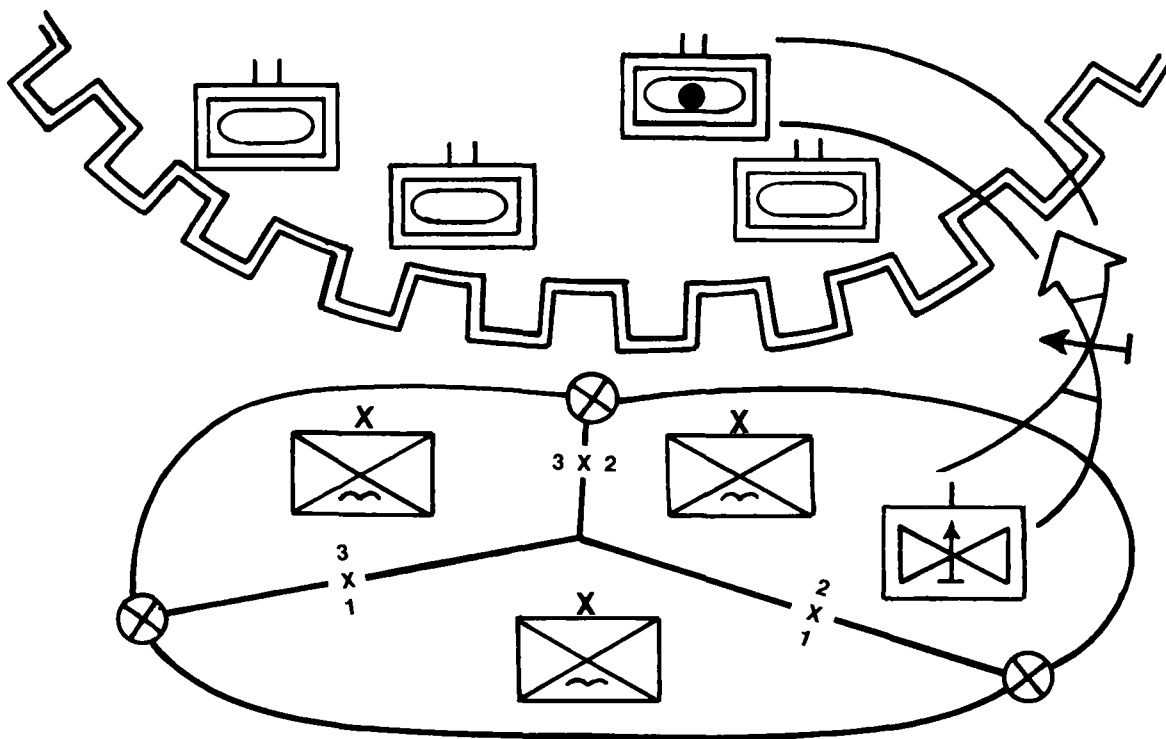


Figure J-22. Attack helicopter company conducting a raid



GLOSSARY

ACRONYMS AND ABBREVIATIONS

A ² C ²	Army airspace command and control
AA	avenue of approach
AADC	area air defense commander
AARS	Advanced Airborne Radius System
AAST	Army Aerial Scout Test
AATF	assault aircraft task force
AATFC	assault aircraft task force commander
AB	aviation brigade
ABMOC	air battle management operations center
ACA	airspace coordination area
acft	aircraft
ACP	air control point
ACR	armored cavalry regiment
AD	air defense
ADA	air defense artillery
admin	administrative
ADSS	ANVIS display symbology system
AH	attack helicopter
AHRS	attitude and heading reference system
AHT	assault helicopter troop
AI	air interdiction
A&L	administrative and logistics
AL	Alabama
ALB-F	AirLand Battle-Future
ALFGL*	automatic low frequency gain limiting
ALO	air liaison officer
ALSE	aviation life support equipment
alt	altitude
ALT	airborne laser tracker
AM	amplitude modulated
AMC	air mission commander
ammo	ammunition
AMO	aviation maintenance officer
ANGLICO	air and naval gunfire liaison company
ANVIS	aviator's night vision imaging system
AP	ammunition point
APC	armored personnel carrier
AR	Army regulation
ART	air reconnaissance troop
arty.	artillery
ARTY*	artillery
ASARS	advanced synthetic aperture radar system
ASE	aircraft survivability equipment
ASO	air support operations

*Control display subsystem nomenclature

ASOC	air support operations center
ASP	aerial supply point
ASPS	all-source production section
asst	assistant
ATACMS	Army tactical missile system
ATAS	air-to-air Stinger
ATGM	antitank guided missile
ATHS	airborne target handover system
atk	attack
ATKHB	attack helicopter battalion
ATKHC	attack helicopter company
ATKHR	attack helicopter regiment
ATO	air-tasking order
ATP	Allied Tactical Publication or ammunition transfer point
ATS	air traffic services
attn	attention
AVIM	aviation intermediate maintenance
avn	aviation
AVUM	aviation unit maintenance
AWACS	Airborne Warning and Control System
BAI	battlefield air interdiction
BCE	battlefield coordination element
BCS	battery computer system
BDA	battle damage assessment
bde	brigade
BH*	black-hot
BHL	battle handover line
BMNT	beginning of morning nautical twilight
BMO	battalion maintenance officer
BMP	Boevaya Mashina Desantnika [literal Russian: combat vehicle, airborne]
bn	battalion
BP	battle position
BRASSCRAF	background, range to target, altitude, sun, shadows, cover and concealment, rotor wash, adequate maneuver area, fields of fire
BRT*	brightness
BTR	Bronetransporter (literal Russian: amphibious armored transporter personnel carrier)
BSA	brigade support area
C ²	command and control
C ³	command, control, and communications
C ² I	command, control, and intelligence
C ³ I	command, control, communications, and intelligence
C	Celsius
CAA	combined arms armies (Soviet)
cal	caliber
CAS	close air support
CB	chemical and biological
cbt	combat

cdr	commander
CE	Corps of Engineers
CEOI	Communications-Electronic Operation Instruction
CFL	coordinated firing line
cGy	centigray
CH*	channel
CHEMWARN	chemical strike warning
CI	combat ineffective
cl	class
CM&D	collection, management, and dissemination
cmd	command
co	company
COMINT	communications intelligence
COMJAM	communications jamming
COMM*	communications
comp	component
COMSEC	communications security
CONEX	container express
CONT*	contrast
CONUS	continental United States
COSCOM	corps support command
CP	command post
CPX	command post exercise
CS	combat support
CSA	corps storage area
CSM	command sergeant major
CSS	combat service support
CTOC	corps tactical operations center
CTT	commander's tactical terminal
DA	Department of the Army or density altitude
DAO	division ammunition officer
DD	Department of Defense
DEA	Drug Enforcement Agency
decon	decontamination
DEK	data entry keyboard
desc	description
DIR WPT*	direct way point
DISCOM	division support command
div	division
DMMC	division materiel management center
DOD	Department of Defense
DP	delivery point
DS	direct support
DSA	division support area
DT	demanding task
DTG	date-time group
DTS	data transfer system
E	east
EA	engagement area
EAC	echelons above corp

ECCM	electronic counter-countermeasures
ECM	electronic countermeasures
EEI	essential elements of information
EENT	end of evening nautical twilight
EER	enlisted evaluation report
eff	effective
ELINT	electronic intelligence
EMP	electromagnetic pulse
engr	engineer
equip	equipment
ESM	electronic warfare support measures
ETE	estimated time en route
ETL	effective translational lift
EW	electronic warfare
EXTAL	extra time allowance
F	Fahrenheit
FA	field artillery
FAA	forward assembly area
FAAD	forward area air defense
FAAO	field artillery air observer
FAC	forward air controller
FAIO	field artillery intelligence officer
FARE	forward area refueling equipment
FARP	forward arming and refueling point
FASCAM	family of scatterable mines
FDC	fire direction center
FEBA	forward edge of battle area
FFA	free-fire area
FFAR	folding fin aerial rocket
FIST	fire support team
fld	field
FLIR	forward-looking infrared
FLOT	forward line of own troops
flt	flight
FM	field manual or frequency modulated
FMC	fully mission capable
FO	forward observer
FOD	foreign object damage
FOV	field of view
FPLN*	flight plan
FRAGO	fragmentary order
FR FRZ*	frame freeze
FS	fire support
FSB	forward support battalion
FSCoord	fire support coordinator
FSE	fire support element
FSCL	fire support coordination line
FSO	fire support officer
Ft	Fort
ft	feet

G1	Assistant Chief of Staff, G1 (Personnel)
G2	Assistant Chief of Staff, G2 (Intelligence)
G3	Assistant Chief of Staff, G3 (Operations and Plans)
gp	group
GLLD	ground laser locator designator
gnd	ground
gph	gallons per hour
GS	general support
GSM	ground station module
GTD	guard tank division (Soviet)
GTL	gun-target line
HA	holding area
HC	hexachloroethane (smoke)
HDU	helmet display unit
HE	high explosive
HEMTT	heavy expanded mobility tactical truck
HF	high frequency
H-FAC	heliborne forward air controller
HFM	Hellfire missile
HHC	headquarters and headquarters company
HI*	high
HIT	health indicator test
HPT	high-payoff target
HQ	headquarters
hr	hour
HS	highly sensitive
HSC	headquarters and service company
HSD	horizontal situation display
HSS	health service support
HUMINT	human intelligence
HVT	high-value target
hvy	heavy
ID	identification
IFF	identification, friend or foe (radar)
IGRV	improved Guardrail V
IMC	instrument meteorological conditions
IMINT	imagery intelligence
inl	initial
int	intersection
intel	intelligence
INTG*	integrate
INTSUM	intelligence summary
IP	initial point
IPB	intelligence preparation of the battlefield
IPF	integrated processing facility
IR	infrared
ITO	installation transportation office

JAAT	joint air attack team
JP	jet petroleum
J-SEAD	joint suppression of enemy air defense
KIAS	knots indicated airspeed
km	kilometer
KMIH	kilometers traveled in an hour
kmph	kilometers per hour
kt	knot
KZ	kill zone
LAMPS	light airborne multipurpose system
LC	line of contact
LD	line of departure
ldr	leader
LGB	laser-guided bomb
LIC	low-intensity conflict
LO	liaison officer; low*
LOA	limit of advance
LOAL	lock-on after launch
LOBL	lock-on before launch
LOC	lines of communication
LOGPAC	logistics package
LOI	letter of instruction
LORAN-C	long range navigation-C series
LOS	line of sight
LPU	limited production--urgent
LRF/D	laser range finder/designator
LRSU	long-range surveillance unit
LST	laser spot tracker
lt	light
LTL	laser-to-target line
L/W	lead/wingman
LZ	landing zone
m	meter
MAC	Military Airlift Command
MACOM	major Army command
maint	maintenance
MARKS	Modern Army Recordkeeping System
max	maximum
mech	mechanized
MEDEVAC	medical evacuation
METL	mission-essential task list
METT-T	mission, enemy, terrain, troops, and time available
MFD	multifunction display
MG	machine gun
MI	military intelligence
MIH	miles traveled in an hour
min	minute
MLRS	multiple launch rocket system
mm	millimeter

MMC	materiel management center
MMS	mast-mounted sight
MOPP	mission-oriented protective posture
MOS	military occupational skill
mph	miles per hour
MPLH	multipurpose light helicopter
MPSM	multipurpose submunition
MR	moonrise
MRE	meal, ready to eat
MS	moonset or military specification
MSB	main support battalion
MSE	mobile subscriber equipment
MSR	main supply route
MTO	message to observer
N	north
NAAK	nerve agent antidote kit
NAI	named areas of interest
NATO	North Atlantic Treaty Organization
NAV ALN*	navigation alignment
NAV ALN VAR*	navigation alignment variation
NAV UPD*	navigation update
NBC	nuclear, biological, chemical
NBCWRS	NBC warning and reporting system
NCO	noncommissioned officer
NCOIC	noncommissioned officer in charge
NCS	net control station
NEXT WPT*	next way point
NFA	no-fire area
NFOV	narrow field of view
NM	nautical mile
no	number
NOE	nap-of-the-earth
NORMA	nature of the target, obstacle clearance, range to target, multiple firing positions, adequate area for proper dispersion between aircraft
NOTAM	notice to airmen
NTC	National Training Center
NVD	night vision device
NVG	night vision goggles
OBS	optical boresight system
OCOKA	observation and fields of fire, cover and concealment, obstacles and movement, key terrain, avenue of approach
ODA	optical display assembly
OER	officer evaluation report
OH	observation helicopter
O&I	operations and intelligence
OIC	officer in charge
OP	observation post
OPCON	operational control
OPLAN	operation plan

opn	operation
OPORD	operation order
OPSEC	operations security
OR	operational readiness
OSET*	offset
PA	pressure altitude
PAC	personnel and administration center
PC	pilot in command
PD	performance degraded
PIR	priority intelligence requirement
P _k	probability of kill
PL	phase line
plt	platoon
PMC	partially mission capable
PMCS	preventive maintenance checks and services
PNVS	pilots night vision system
POC	point of contact
POD	point of debarkation
POE	port of entry
POL	petroleum, oils, and lubricants
POM	preparation of oversea movement of units
POR	preparation of replacements for overseas movement
pos	position
PP*	present position
PPC	performance planning card
PPT*	prepoint
PRF	pulse-repetition frequency
psi	pounds per square inch
PSNCO	personnel staff noncommissioned officer
PSS	personnel service support
PW	prisoner of war
PZ	pickup zone
QSTAG	Quadripartite Standardization Agreement
rd	road
RDF	rapid deployment force
REDCON	readiness condition
rgt	regiment
RF	radio frequency
RFA	restrictive fire area
RFL	restrictive fire line
RKTS*	rockets
RL	readiness level
rng	range
ROE	rules of engagement
RP	reference point
RPM	revolutions per minute
RTO	radio telephone operator

S1	Adjutant (US Army)
S2	Intelligence Officer (US Army)
S3	Operations and Training Officer (US Army)
S4	Supply Officer (US Army)
S	south
SALT	supporting arms liaison team
SALUTE	size, activity, location, unit, time, and equipment
SAM	surface-to-air missile
SCL SEL*	scale select
SEAD	suppression of enemy air defense
sec	section
sgt	sergeant
SIDPERS	Standard Installation/Division Personnel System
SIGINT	signal intelligence
SIGSEC	signal security
SINGARS	single channel ground and air radio system
SITREP	situation report
SLAR	side-looking airborne radar
SMCT	soldiers manual of common tasks
SOI	signal operation instructions
SOP	standing operating procedure
SOR	specific orders and requests
SP	start point
SPC	specialist
SS	sunset
SSSC	self-service supply center
STANAG	standardization agreement
STB	supertropical bleach
STRIKWARN	strike warning
swbd	switchboard
SWT	scout-weapons team
TAADS	The Army Authorization Documents System
tac	tactical
TACC	tactical air control center
TACAIR	tactical air
TACAN	tactical air navigation
TACFIRE	tactical fire
TACP	tactical air control party
TACS	tactical air control system
TADS	target acquisition and designation system
TAI	total active aircraft inventory
TCAE	technical control and analysis element
TCF	tactical combat force
TD	tank division (Soviet)
TDIS	time-distance
temp	temperature
TF	task force
tgt	target
TGT LOC*	target locate
TIS INTG*	thermal imaging sensor integrate
tk	tank

tm	team
TOC	tactical operations center
TOD*	Time of Day
TOE	table(s) of organization and equipment
TOW	tube-launched, optically tracked, wire-guided
TP*	turn point
TR	tank regiment
TRADOC	(United States Army) Training and Doctrine Command
trp	troop
TRP	target reference point
TSA	theater storage area
tt	training text
TTP	tactics, techniques, and procedures
TV	television
TVS	television sensor
UCMJ	Uniform Code of Military Justice
UH	utility helicopter
UHF	ultra high frequency
UMT	unit ministry team
US	United States (of America)
USA	United States Army
USAF	United States Air Force
UT	undemanding task
UTM	universal transverse mercator
VA	Virginia
VAR*	variation
veh	vehicle
VHF	very high frequency
vis	visibility
vpk	vehicles per kilometer
vpm	vehicles per mile
VROC	vertical rate of climb
VSD	vertical situation display
VTR	video tape recorder
W	west
WCS	weapons control status
WFOV	wide field of view
WH*	white-hot
WP	white phosphorous
wpn	weapon
WPT*	way point
WSRO	weapon system replacement operations
XO	executive officer
XTK*	cross track

REFERENCES

Section I

REQUIRED PUBLICATIONS

Required publications are sources that users must read in order to understand or to comply with this publication.

ARMY REGULATIONS

25-400-2	The Modern Army Recordkeeping System (MARKS)
95-1	Aviation: Flight Regulations
220-15	Journals and Journal Files
351-1	Individual Military Education and Training
385-10	Army Safety Program

FIELD MANUALS

1-100	Doctrinal Principles for Army Aviation in Combat Operations
1-104	Forward Arming and Refueling Points
1-111	Aviation Brigades
1-114	Tactics, Techniques, and Procedures for the Regimental Aviation Squadron
1-116	Tactics, Techniques, and Procedures for the Air Cavalry/Reconnaissance Troop
1-117	Air Reconnaissance Squadron
1-140	Helicopter Gunnery
1-202	Environmental Flight
1-301	Aeromedical Training for Flight Personnel
3-3	NBC Contamination Avoidance
3-4	NBC Protection
3-5	NBC Decontamination

3-6	Field Behavior of NBC Agents (Including Smoke and Incendiaries)
3-8	Chemical Reference Book
3-50	Deliberate Smoke Operations
3-100	NBC Operations
6-20	Fire Support in the AirLand Battle
8-9	NATO Handbook on the Medical Aspects of NBC Defensive Operations
8-285	Treatment of Chemical Agent Casualties and Conventional Military Chemical Injuries
14-7	Finance Operations
16-1	Religious Support Doctrine: The Chaplain and Chaplain Assistant
17-50-1	Attack Helicopter Team Handbook
21-11	First Aid for Soldiers
21-33	Terrain Analysis
34-3	Intelligence Analysis
34-40	(S)Electronic Warfare Operations(U)
44-8	Small Unit Self-Defense Against Air Attack
55-9	Unit Air Movement Planning
55-20	Army Rail Transport Units and Operations
63-2	Combat Service Support Operations--Division (How to Support)
63-3J	Combat Service Support Operations--Corps
71-100	Armored and Mechanized Division Operations (How to Fight)
100-2-1	Soviet Army Operations and Tactics
100-5	Operations
100-10	Combat Service Support

100-15	Corps Operations
100-103	Army Airspace Command and Control in a Combat Zone
101-5	Staff Organization and Operations
101-5-1	Operational Teams and Symbols

DEPARTMENT OF THE ARMY FORMS

581	Request for Issue and Turn-In of Ammunition
1594	Daily Staff Journal or Duty Officer's Log
2028	Recommended Changes to Publications and Blank Forms
2404	Equipment Inspection and Maintenance Worksheet
2627	Record of Proceedings Under Article 15, UCMJ
4004	Message Book M-210-B

DEPARTMENT OF DEFENSE FORMS

458	Charge Sheet
1387-2	Special Handling Data/Certification

GRAPHIC TRAINING AID

3-6-3	NBC Warning and Reporting System
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SOLDIER TRAINING PUBLICATION

21-1-SMCT	Soldiers Manual of Common Tasks (Skill Level 1)
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TECHNICAL MANUALS

3-4240-280-10	Operations Manual for Mask, Chemical-Biological: Aircraft, ABC-M24 and Accessories and Mask, Chemical-Biological, Tank, M25A1 and Accessories
43-0001-28-1	(C)Army Ammunition Data Sheets for Artillery Ammunition: Guns, Howitzers, Mortars, Recoilless Rifles, Grenade Launchers, and Artillery Fuses(U)

TRAINING CIRCULAR

1-210 Aircrew Training Program: Commander's Guide

Section II

RELATED PUBLICATIONS

Related publications are sources of additional information. They are not required in order to understand this publication.

ARMY REGULATIONS

5-9	Intraservice Support Installation Area Coordination
55-1	CONEX/MILVAN Equipment Control, Utilization, and Reporting
55-4	CONUS Military Installation Materiel Outloading and Receiving Capability Report
55-9	Overseas Ocean Terminal Handling and Inland Line-Haul Cargo Cost Report
55-23	Submission of Dry Cargo Requirements and the Assignment and Allocation of Sea Transportation Space
55-29	Military Convoy Operations in CONUS
55-36	DOD Use of Domestic Civil Transportation Under Emergency Conditions
55-60	Official Table of Distances (Continental United States, Alaska, Hawaii, Canada, Canal Zone, Central America, Mexico, and Puerto Rico)
55-71	Transportation of Personal Property and Related Services
55-113	Movement of Units Within Continental United States
55-162	Permits for Oversize, Overweight, or Other Special Military Movements on Public Highways in the United States
55-355	Defense Traffic Management Regulation
59-18	Management of System 463L Pallets, Nets, and Tie-Down Equipment
70-47	Engineering for Transportability

190-11	Physical Security of Arms, Ammunition, and Explosives
220-10	Preparation for Oversea Movement of Units (POM)
310-25	Dictionary of United States Army Terms
310-31	Management System for Tables of Organization and Equipment (The TOE System)
310-49	The Army Authorization Documents System (TAADS)
380-5	Department of the Army Information Security Program
700-15	Packaging of Materiel
740-32	Responsibilities for Technical Escort of Dangerous Materials
746-1	Packaging of Army Materiel for Shipment and Storage

DA PAMPHLETS

25-30	Consolidated Index of Army Publications and Blank Forms
746-1	Pallets and Storage Aids for Army Use

FIELD MANUALS

1-102	Army Aviation in an NBC Environment
1-109	Aviation Self-Deployment Planning
5-36	Route Reconnaissance and Classification
10-13	Supply and Service Reference Data
12-6	Personnel Doctrine
34-81	Weather Support for Army Tactical Operations
55-10	Movement Control in a Theater of Operations
55-12	Movement of Units in Air Force Aircraft
55-15	Transportation Reference Data
55-30	Army Motor Transport Units and Operations
55-65	Strategic Deployment by Surface Transportation

55-312	Military Convoy Operations in the Continental United States
71-3	Armored and Mechanized Infantry Brigade
90-21	Multiservice Joint Air Attack Team Operations

TECHNICAL BULLETINS

55-45	Certification of Military Equipment for Transport in MAC/CRAF Aircraft
55-46-1	Standard Characteristics (Dimensions, Weight, and Cube) for Transportability of Military Vehicles and Other Outsize/Overweight Equipment
55-46-2	Standard Transportability Characteristics (Dimensions, Weight, and Cube) for Military Vehicles and Equipment

TECHNICAL MANUALS

38-230-1	Packaging of Materiel: Preservation (Vol I)
38-230-2	Packaging of Materiel: Preservation (Vol II)
38-250	Packaging and Materials Handling: Preparing of Hazardous Materials for Military Air Shipments
55-601	Railcar Loading Procedures
55-603	Movement of Military Impediments by Commercial Carriers
55-2200-001-12	Transportability Guidance for Application of Blocking, Bracing, and Tiedown Materials for Rail Transport

Section III

COMMAND PUBLICATIONS

Command publications cannot be obtained through Armywide resupply channels. Availability may be determined by contacting the address shown.

TRADOC TRAINING TEXTS

34-3	Joint Laser Designator Procedures, December 1985
100-44-1	Joint Suppression of Enemy Air Defense (J-SEAD), June 1982

525-45

General Operating Procedures for Joint Attack of the Second
Echelon (J-SAK), December 1984

Commander
US Army Training and Doctrine Command
ATTN: ATCD-ALFA
Langley AFB, VA 23665

Section IV

PROJECTED PUBLICATIONS

Projected publications are sources of information that are scheduled for printing but are not yet available. Upon print, they will be distributed automatically via pinpoint distribution. They may not be obtained from the US Army Publications Distribution Center, 2800 Eastern Boulevard, Baltimore, Maryland 21220-2896, until indexed in DA Pamphlet 25-30.

FIELD MANUALS

1-107	Air Combat Operations (Approved Final Draft, June 1989)
25-101	Battle Focused Training (Approved Final Draft, April 1990)



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